

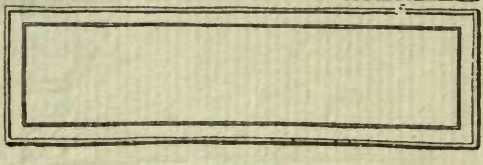
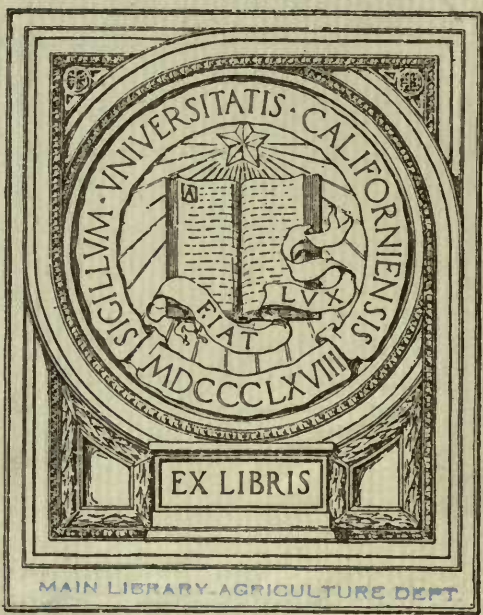
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# The FRUIT GROWER'S GUIDE

















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Nouvelle Fulvie.

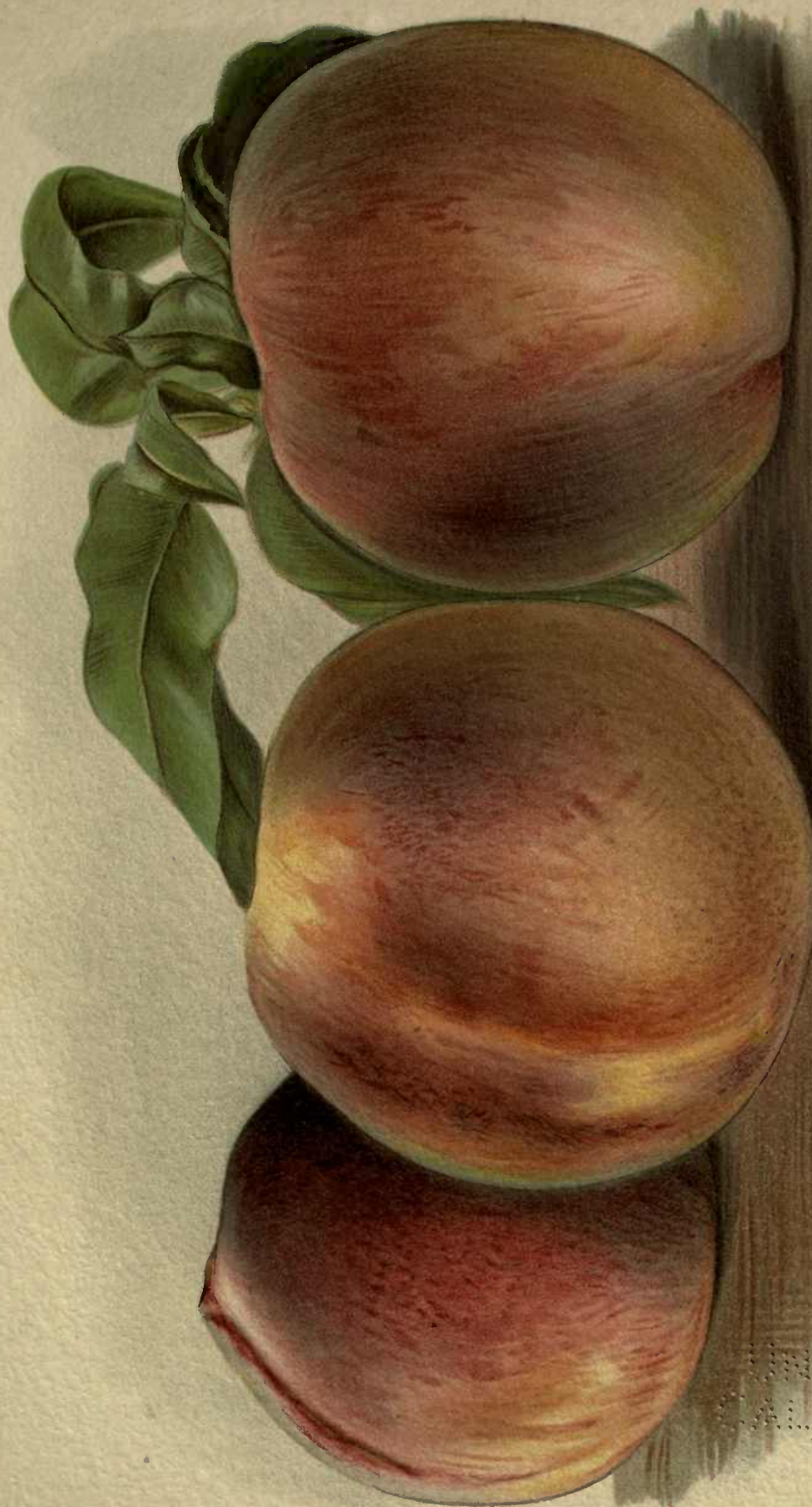


Olivier de Serres.









Sea Eagle.

Princess of Wales.

Nectarine-Peach.







Black Hamburg.

Buckland Sweetwater.

Black Alicante.

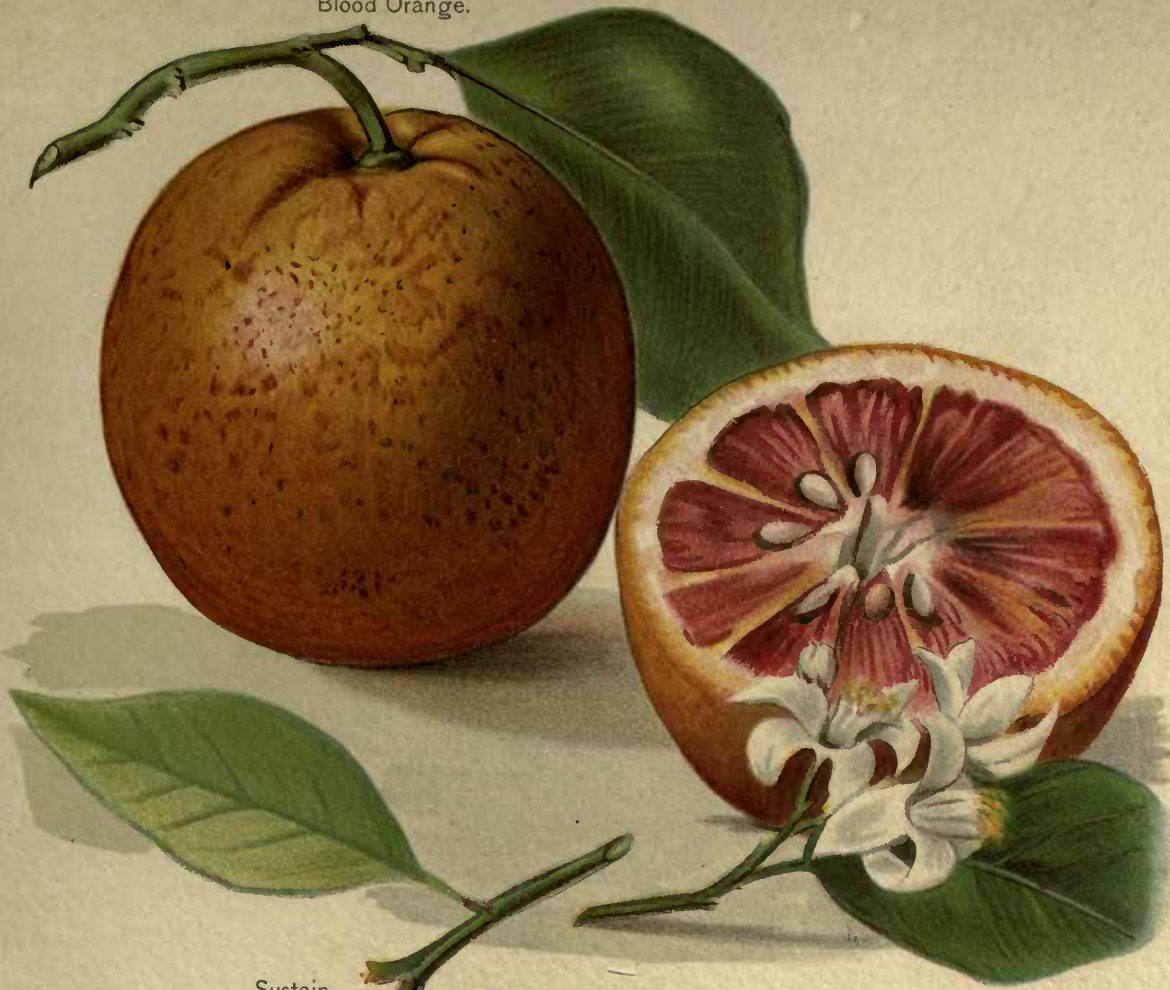
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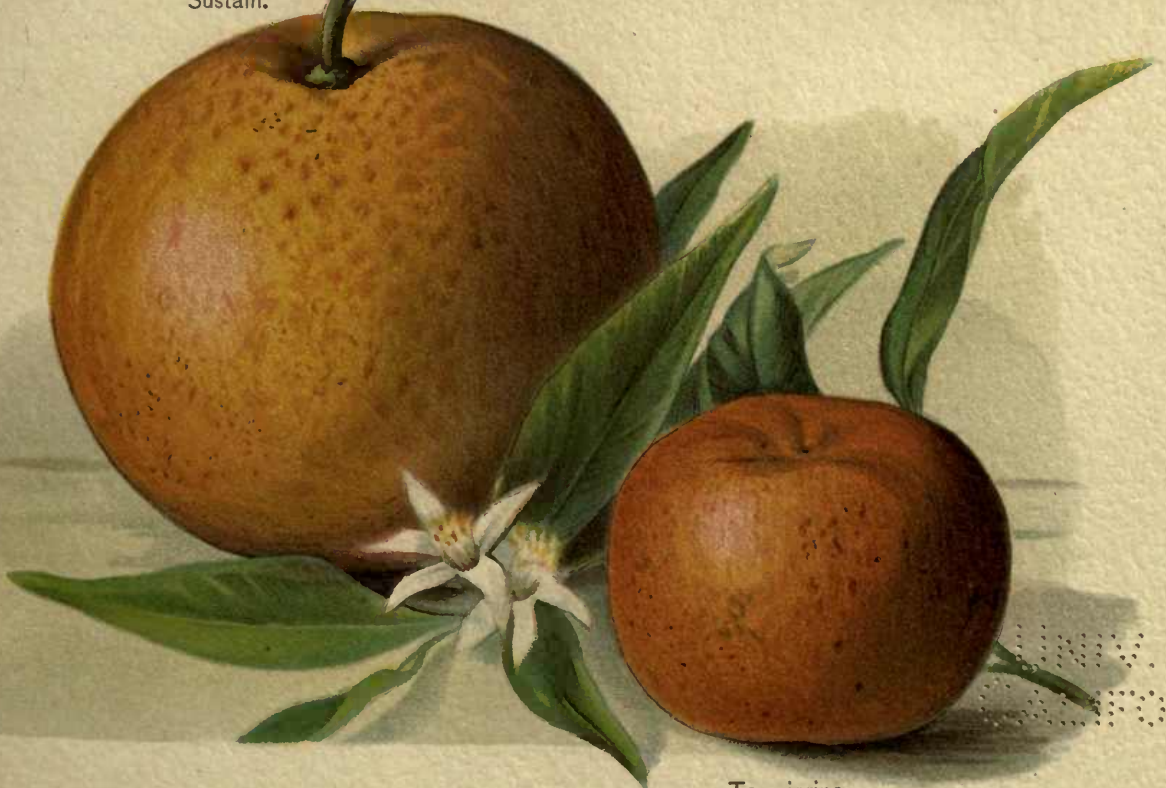
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AMERICAN



Blood Orange.



Sustain.



Tangerine.









Gansel's Bergamot



Van Mons Leon le Clerc.



Durondeau.



Portugal Quince.







Mrs. Pince's Muscat.



Royal Muscadine.

Chasselas Vibert.



Foster's Seedling.



Mrs. Pearson.

Gros Maroc.

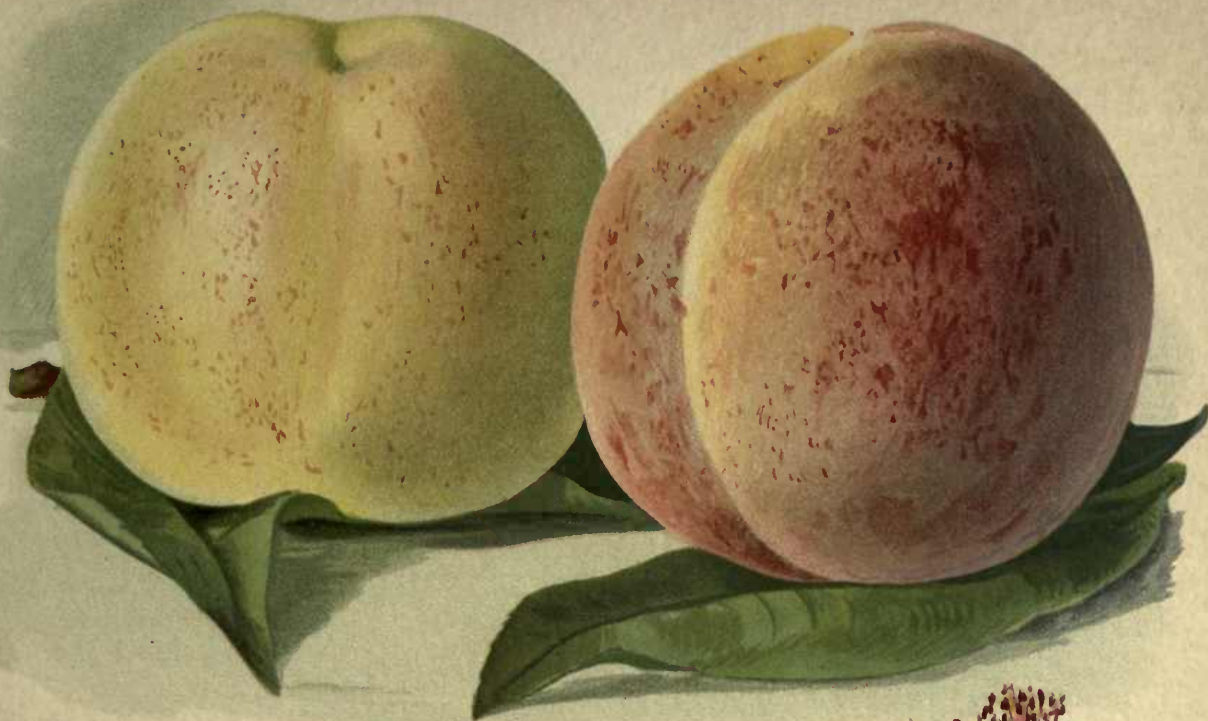


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Alexandra Noblesse (Rivers).

Royal George.



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Crimson Galande.



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THE  
FRUIT GROWER'S GUIDE

BY

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AND

NUMEROUS ILLUSTRATIVE DIAGRAMS BY WORTHINGTON G. SMITH AND GEORGE SHAYLER

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# THE FRUIT GROWER'S GUIDE.

## APPLES.\*

### MODES OF TRAINING.

**C**ULTIVATED trees require management in training. If left to nature they assume forms not pleasing and proportions exceeding the limits available for them in certain positions, and the growths become crowded and unfruitful. For insuring fruitfulness the branches must be disposed so as to admit light and air freely, and they must be regulated so as to cause an equal distribution of the sap, or some branches will be much too strong and others correspondingly weak. It is an axiom in gardening that sap flows most readily in free upright channels, and most tardily in the crooked, oblique, and horizontal branches. An equal diffusion of sap or food should be the object of the cultivator.

Several methods of training are adopted in the management of apples, some positions being better adapted for one form than for another. The principal are the pyramidal, and bush; the fan, horizontal, upright and diagonal cordons, with modifications of these for adaptability to positions and the tastes of individuals. We propose to give examples from the smallest planting trees, or maidens, to trees of fruiting size.

*Pyramidal Trees.*—These occupy less space than other forms and are much in request for planting in borders along the sides of paths in gardens. They should be planted about 3 feet from the edging, and 6 feet apart. At this distance they may remain permanently, if subjected to root-pruning, but if they are desired to grow into large trees every other must be removed before they touch, and those remaining set back 3 feet so that they will stand 12 feet apart in the rows and 6 feet from the path. A row of pyramids 12 or more feet in height on each side of the paths of large gardens have an imposing appearance. The trees can be planted 6 feet from the path in the first instance, if preferred, for obviating the necessity of re-planting,

\* Continued from Vol. I.



which cannot well be done after a lapse of six or seven years without giving a check more or less prejudicial to the cropping for a year or two after the removal. It is, however, usually desirable to put in temporary trees between those intended to be permanent with a view to early produce and profitable employment of the space. In the formation of pyramid trees a few sketches will be elucidatory.

Fig. 1.—*A* is a maiden tree a year from the bud or graft. The term “maiden” is applied to an untrained fruit tree. The first year's growth from the point of junction

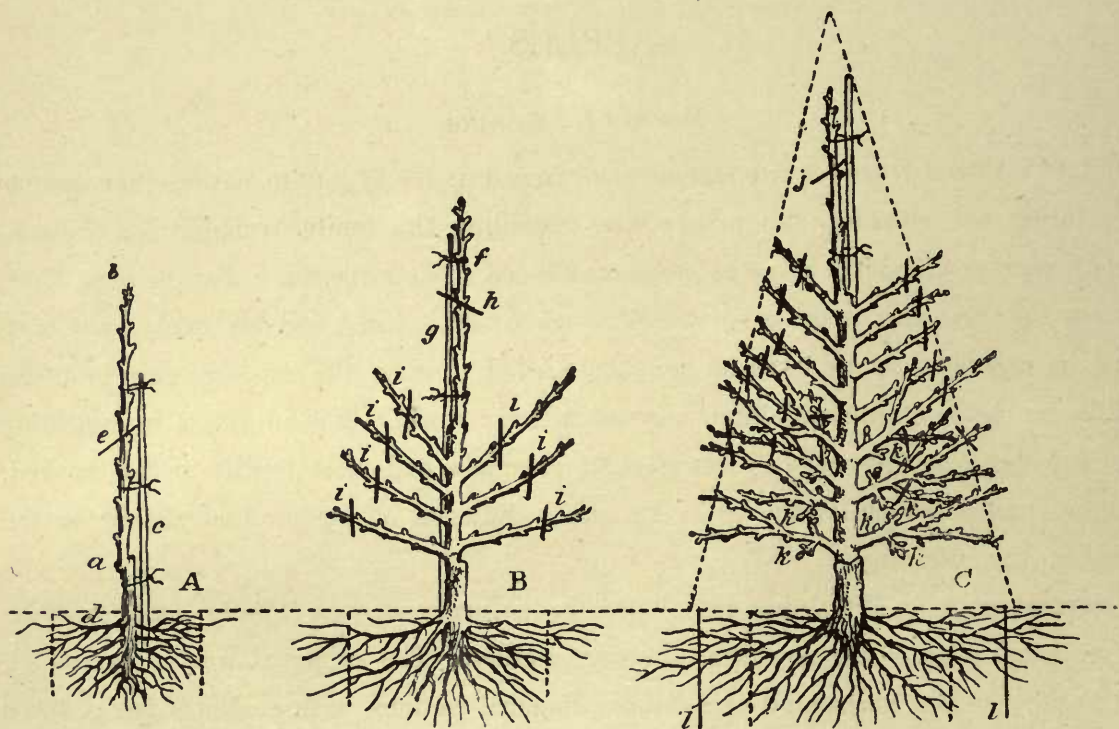


Fig. 1. FORMING PYRAMID TREES. (Scale:  $\frac{1}{2}$  inch = 1 foot.)

*References*:—*A*, budded maiden tree: *a*, junction with stock; *b*, extremity; *c*, stake; *d*, roots; *e*, heading point. *B*, one-year-trained tree: *f*, leading shoot; *g*, stake; *h*, point of shortening leader; *i*, side shoots; bars, point of shortening. *C*, two-years-trained tree: *j*, point of shortening leader; *k*, blossom buds; bars, places of pruning; cutting roots at the upright dotted lines gives severe, at *l* slight, check only

with the stock (*a*) to its extremity (*b*), has been secured to a stake (*c*); the young tree is about 3 feet in height, sturdy and healthy, well furnished with roots (*d*). After the leaves have fallen such a tree is most eligible for transplantation, and by inserting the spade 9 inches from the stem, as shown by the dotted lines, it can be lifted with little loss of roots. If these are kept moist whilst out of the ground, and the tree is quickly, yet properly, planted, it will scarcely feel the effects of removal, but will emit roots early and grow freely during the ensuing season. It is not, however,



the usual practice to purchase and plant such young trees, but whether they remain in the nursery or are moved, they must be headed or cut back to *e*. For this purpose a knife with a keen edge must be properly used. It is used properly by placing it at the back of the shoot and bringing it through with a slanting cut upwards, a little above the bud to which the tree is pruned, as is shown by the full bar; the sloping cut is then away from the bud, and if any water lodge or any decay of bark take place it will be on that side opposite to the bud; whereas, by making the cut from the same side as the bud, also upward, the water will fall to the bud, and any decay occurring will be to its prejudice.

*B* (page 2) shows the tree one year trained, or with seven shoots and a leader. The maiden tree was shortened back to 15 inches. The leading shoot (*f*) having had due support from a stake (*g*) will be perfectly upright and should be cut back to 18 inches if vigorous, as shown (*h*), or if not more than that length, it may be cut back about one-third, alike to strengthen its subsequent growth, and to induce side shoots to push freely. All the side shoots (*i*) should be cut back, in the manner indicated by the full bar, upwards. The tree is still in good condition for removal, and by lifting with a radius of one foot from the stem, as indicated by the upright dotted lines, there is little loss of roots.

*C* (page 2) shows the tree three years from the bud or graft, 4 feet 6 inches high when cut back to *j*, and well furnished to the base, or what the nurseryman delights to supply his customer with, namely, a tree with a foundation, and not only that but with blossom buds (*k*) on the two-year-old wood. It is in fact a bearing tree, the branches extending beyond the dotted lines of the pyramid, only needing to be shortened back as shown by the bars and the leader (*j*) to secure the requisite shoots in the ensuing season. The growths where closer together than 9 inches in the interior of the tree should be cut away to an inch or less from the point of origin as indicated by the bars. The lower shoots are not shortened, as from their position they will not grow so vigorously as the upper; besides, the fruiting state being induced, they will have the vital forces concentrated thereon instead of expended in the production of wood. The tree is yet in good order for removal, but the roots having extended considerably would be seriously reduced by taking out a trench at the dotted lines, and a severe check thus given to the aftergrowth; but by going 6 inches further away all around (*l*) in lifting there is not much loss of roots, or not more than corresponds to the branches removed in pruning; and with care in preventing the roots drying, and in planting, the tree will



make sufficient growth in the following season to preserve its symmetry, and instead of being injured will be benefited by the removal. The great fault in some trees lies in their not having been originally cut back low enough, and hence they are badly furnished with shoots near the base. Some have no shoots on one side for a distance of 2 feet from the ground, whilst there are plenty on the other side: this is owing to their standing too closely together. Those, therefore requiring symmetrical trees, which when in full foliage and fruit are the admiration of all, must take care to secure them with the requisite foundation, or rear them according to the instructions.

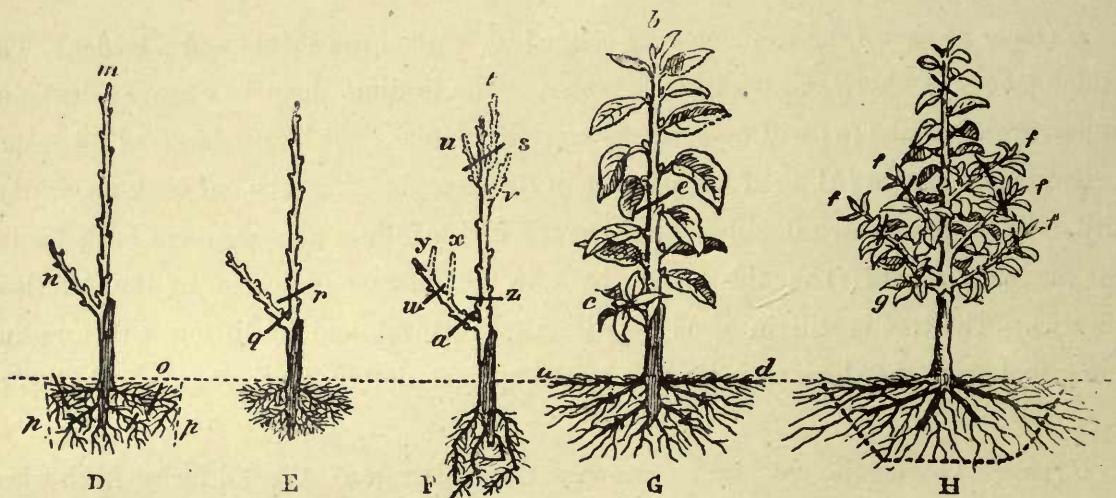


Fig. 2. PYRAMID TRAINING—GOOD AND BAD PRACTICE. (Scale:  $\frac{1}{2}$  inch = 1 foot.)

*References*:—*D*, grafted maiden tree: *m*, upright shoot; *n*, side shoot; *o*, point of inserting spade in lifting, or shortening long roots; *p*, place of digging around tree for lifting. *E*, tree properly planted, and cut hard back through loss of roots: *r*, leader shortened to two buds; *q*, side shoot shortened to one bud. *F*, wrongly planted and pruned tree: *s*, leader pruning—*t*, *u*, and *v*, growths resulting; *w*, side shoot pruning—*y* and *x*, growths following; *z*, proper point to shorten leader; *a*, right point to shorten side shoot. *G*, tree in first growth after pruning: *b*, upright shoot; *c*, spur; *d*, surface roots; *e*, point of autumn pruning. *H*, tree in second year after close heading: *f*, side shoots; bars, points of cutting back in autumn; *g*, spur with blossom bud; dotted lines, extent of roots cut off in lifting.

Fig. 2.—Pyramidal training from the grafted and planted maiden *D*. This has been worked with a scion having two buds, and made two shoots, an upright (*m*), and a side growth (*n*). It is lifted in two ways, first, by thrusting in the spade around the tree so as to cut the straggling roots clean off, or, second, by digging around at (*p*), and in withdrawing the soil, breaking the long roots somewhat after the manner represented. These broken roots should be cut off as shown at the bars *o*, and the ends must be pared smooth with a sharp knife before planting. They must be spread out and have soil worked in between them so that when completed they are as represented in *E*; then in good soil



and with manure spread on the surface as far as the roots extend, or a little more, the tree will flourish. It need not be pruned until March, but should be secured to a stake to prevent the stem being twisted by the wind. If this is allowed, a hole is made in soft weather, the air and frost enter, and fresh root action is arrested. The rains wash the virtues of the manure into the soil, and encourage the production of surface roots. These are a characteristic of trees on the dwarf stock and conducive to fruitfulness. During mild weather after the middle of February and not later than early March the side shoot (*n*) is cut back to one eye or bud (*q*), and the upright to two buds (*r*), whereby nearly a year's growth is at one stroke cut away. It did not occur in *A*, page 2. Why in *D*? Because the roots of the tree *A* were not broken or seriously curtailed, and replanting was done quickly and well. Digging up a tree roughly, and conveying it from a nursery to a garden by road or railway makes all the difference, for it is not possible to transplant a tree, with the roots much diminished, and good growth follow if the parts above ground are not correspondingly shortened, and the more such a tree is cut back the stronger will be the resulting growth. Planted early in the autumn whilst the ground is warm, the tree will at once push forth fresh rootlets, and good growth may be expected in the following season. The tree *F* is intended to represent the counterfeit of *D*, received and planted with its roots broken, and sunk some inches deeper than they were in the nursery, as if to induce them to strike into the subsoil as quickly as possible.

That is entirely wrong. The top is shortened a little, and the side growth also. The leader (*s*) is cut off where shown. This gives rise to the growths *t*, *u*, and *v*; the side growth cut to *w*, giving rise to the shoots *x* and *y*, the remaining buds lying dormant. What is the result?—a one-sided, top-heavy tree, which is no credit to the cultivator. How can this bad tree be made into a good one? The desirable change can be effected by cutting it boldly back to *z*, and the side growth to *a*, the following season; also replanting and spreading out the roots just under the surface, after trimming off the broken parts as in *E*. Though a year is lost in the operation, it is the quickest method of restoring a wrongly planted and mismanaged tree.

*G* is the first growth of *E* after pruning, namely an upright shoot (*b*) and a short stubby side shoot—a spur—(*c*), and the tree has emitted roots freely. The roots have increased near the surface (*d*), thereby showing their appreciation of the manurial dressing; the growth should be secured to a stake with a soft ligature against damage from wind. In the autumn after the leaves fall, the stem is headed back to *e*, in



no case deferring the pruning later than March, and never pruning in sharp frosty weather.

*H* is the tree advanced a year and it will occasion little trouble, but the leader must have due support, and all side shoots other than *f*, be pinched to three leaves in the first instance, and to one subsequently as growth is made. In the autumn it has the leader and side shoots (*f*) cut back to the bars, and is a well-furnished and promising tree. The spur (*g*) has formed a round fruit bud, which is larger than a wood bud, and is surrounded by a whorl of small leaves, and the tree is in admirable condition for lifting, if dwarf culture is the object. This means restriction of growth, and so keeping the tree small by detaching some roots, but not to a greater degree than shown by the dotted lines, and as lifting means moving with soil adhering to the roots its chief effect is to further the production of fibres, which favour the formation of fruit buds.

Assuming that restricted culture has been decided upon, the tree *H* (page 4) is lifted in the early autumn, with perhaps some leaves remaining on the parts last to ripen and we have it replanted and leafless, as shown in *I*, Fig. 3 (opposite), in the same place or new quarters. The tree should have a stake 4 feet 6 inches out of the ground, and pegs put in as shown, with tarred string from the pegs to the upper part of the stake or 4 feet from the ground. Bamboo stakes are excellent and durable. The shoots (*h*) which correspond to (*f*) in the preceding sketch (Fig. 2), are brought down, as shown by the dotted lines, to a nearly horizontal position, and secured to the strings, a light mulching of any spent material being placed on the surface a little farther from the stem outwards than the roots extend. Fresh rootlets will push during the winter as circumstances favour, and good growth will be made by midsummer. If not lifted the tree would have made quite as much growth as shown to the right of the stem in *J* (Fig. 3). The scale is here doubled, alike to show the tree in leaf and to give our juvenile readers an idea of proportions, as well as the difference in growth as influenced by lifting and replanting. Unlifted the tree will have made shoots several inches in length before midsummer, as shown on the right in the figure. During June stop all the leading side shoots to six leaves, not counting the small base leaves as shown by the dotted lines (*j*), also the leader (*k*); all other shoots not required for extension to be pinched at the third leaf. Fresh growths will be made, but leave them until September, then cut them back to three leaves, and pinch those which pushed after the previous stopping to one leaf, and the leader at the full bar. This will admit the late summer sun, and, if the autumn is favourable to the maturity



of the wood and buds, we may calculate on some fruit from the unlifted and large tree in the season following.

Now turn to the other side, or left of the tree. In the two lower branches we have the result of replanting, namely, lessened vigour, yet stout, short-jointed shoots, with abundant rather small but thick leaves. Instead of the shoots extending the length of



Fig. 3. ADVANCED PYRAMIDS. (Scale: small tree,  $\frac{1}{2}$  inch; large trees, 1 inch = 1 foot.)

References:—*I*, two-years-trained tree, staked, and side growths, *h*, adjusted to strings. *J*, tree in third year after heading, showing non-restriction on right: *i*, spurs; *j*, side shoots pinched at dotted bars; *k*, point of pinching leader; restriction on left, *n*, unrestricted length of growths, pinched as shown; *o*, result of pinching; full bars, autumn pruning. *K*, restricted tree in bearing.

those on the opposite side (*m*), or to the extent of the dotted lines (*n*), they are short as shown at *o*, and terminated by a large oval bud with leaves clustered around it. Lifting and replanting is followed by fruit spurs (*l*), but should they elongate, it is prevented by pinching as shown by the bars, by which process fruit buds will assuredly be formed and perfected. One of these, on a spur of the previous year, has blossomed and produced a fruit (*i*).



In the autumn the second tier of side shoots are brought down from the dotted lines to the position they occupy in *K* (page 7), and any pruning that may appear necessary should be done. Little of this, however, will be needed if summer pinching has been attended to. A surface dressing of manure will make all complete for the winter, and in spring the tree will be a source of considerable interest from the expanding blossom, and as summer advances it will appear as shown in the figure, only more fruits may form. Those on the tree have been reduced to twenty-one, and it is only a little over  $2\frac{1}{2}$  feet wide at the base, and 4 feet high when summer pruned. It is sturdy and fruitful because it has been made to produce an abundance of fibrous roots near the surface of the ground, where the soil is the most fertile, and was kept moist there by the covering of manure, which is termed mulching; and the thin disposal of the branches, with summer pinching, induced the formation of blossom buds.

Had no care been taken to secure roots near the surface by keeping it moist and fertile, the result would have been very different. With dry and poor surface soil the roots strike downwards in search of water, making few fibres till they reach it, and the growth is then correspondingly strong, watery, spurless, hence fruitless in character. It may be useful to show the difference between good and bad management in the same figure.

Fig. 4.—*L* represents a tree the right side of which indicates good management, the opposite side neglect. Observe the fibrous roots and the growth of the tree. Fruit is being produced on the right side, yet the tree is becoming too vigorous as is evidenced by the strong shoots pushing at *p*, after the leader was stopped at *q*, also by the extension of the leader (*r*), and the axillary shoot (*s*). These are shortened at the bars towards the end of summer, and the ends of the longer shoots are also taken off where shown. In addition, some of them are cut out to within two or three leaves of the base. This is to prevent overcrowding, and to admit the sun and air to the leaves on the longer branches. This is absolutely essential for rendering them fruitful; but if the tree is to be kept dwarf, its vigour must be checked by root pruning as soon as the leaves fall. The roots cut at the dotted lines (*t*) across them will arrest growth and increase the fertility of the tree. It is a handsome pyramid 7 feet high and 4 feet through at the base.

Now turn to the left of the figure. The roots have been driven down to the clay subsoil for the moisture they could not find near the surface, and the branch growth is sappy accordingly, as indicated by the dotted lines, and the leader is apt to be broken by the equinoctial gales. No extent of branch pruning alone can render such gross shoots



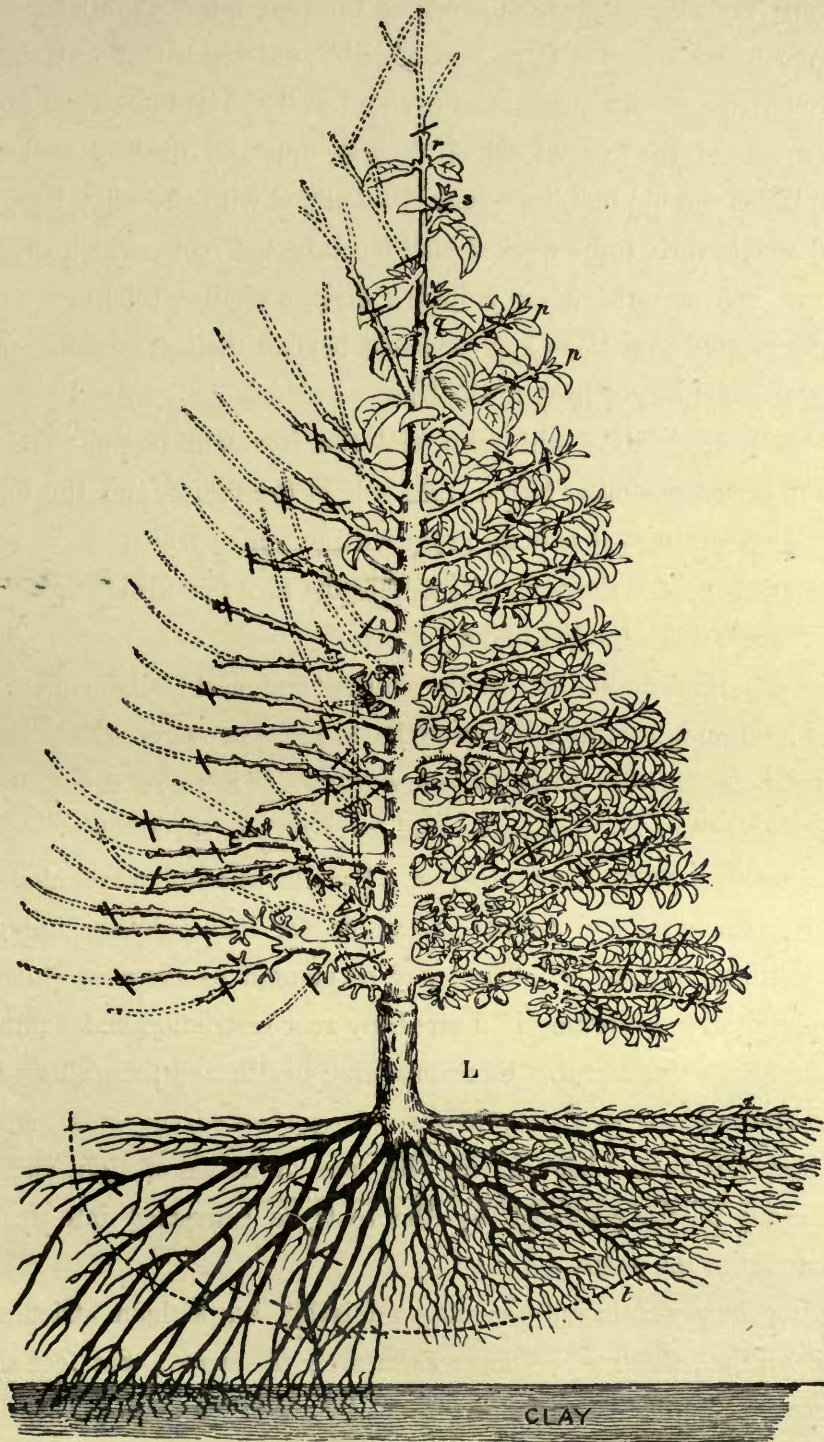


Fig 4. A ROOT AND BRANCH LESSON. (Scale:  $\frac{3}{4}$  inch = 1 foot.)

*References* :—*L*, pyramid tree showing sterility on the left, fruitfulness on the right : *p*, strong shoots resulting from stopping the leader at *q* ; *r*, leader extension ; *s*, axillary shoot ; *t*, cutting roots to check growth. Dotted outlines on the left indicate gross growth ; full bars show the extent of root and branch pruning.



fruitful; the only remedy is to carefully dig up the tree, retaining all the small fibrous roots, with as much soil adhering to them as possible, cutting back the strong roots where they are marked across, then replant carefully and well. The roots must not be allowed to get dry when out of the ground, which, if wet, must be drained, and a quantity of dry mortar rubbish from old buildings should be mixed with the soil; this, with a little fresh loam and wood ashes, to be worked well amongst the roots, which should be spread out, made firm, and covered 3 or 4 inches deep, a similar thickness of manure to be spread on the ground over them and for a foot beyond their extension. At the same time the branches must be cut back to the bars. Little growth may be made the first year, but eventually fresh fibres will form, and the tree will become fruitful through having roots and branches similar to the right side of the figure, and the following year—the third after replanting—it may be laden with excellent fruit.

The columnar form of training is only applicable to a few upright-growing varieties of apple; therefore will be treated under "Pears."

*Bush Training.*—Bush apple-trees are the simplest and most easily managed of all forms. The chief consideration is thinning the growths to prevent overcrowding, and to insure a free exposure of the interior parts to the weather. They are especially adapted for small gardens, generally very productive, and require but little space, affording much interest, and enjoyable, profitable occupation. For planting in borders along the sides of paths they are ornamental and readily accessible for manipulating the growths and supplying all cultural necessities. They may be planted as close as 6 feet apart, and kept as mere pigmies for a lifetime if desired, by root restriction and summer pruning, but larger bushes are more useful. In maintaining health and fruitfulness fibrous roots must be abundant in the surface soil; leaves comparatively large, stout, and leathery in texture; and branches thinly disposed for the free admission of light and air, as then only can the crude matter imbibed by the roots be converted into fruit-producing material, and stored in the stems.

Close planting, however, is not generally advisable, as, without strict adherence to well-conducted routine, the trees become too large for the space. Six feet should be the ultimate minimum of bush trees under dwarf culture, increasing the distance according to the habit of varieties, for while such as Cellini, Margil, and Manks Codlin may be accommodated at 6 feet, strong growers like Lord Grosvenor, Lady Henniker, and others indicated in the lists, Vol. I., page 334, will require 9 feet between the trees. This is mentioned, as crowding the trees is as fatal to free cropping as is crowding the branches of individual



trees. It also destroys their symmetry. There are matters not always taken into account at planting, namely, ultimate issues. Trees are planted in a border or borders, which they ultimately outgrow and cannot be set back on account of other trees, nor brought forward without encroaching on paths. Crop as such trees may, they are an eyesore, and this is a primary point to avoid in fruit culture. First counting the cost before commencing to build is worth many after-considerations.

Where restricted culture is not intended bush trees may be planted 6 feet apart with the view to early profit. Every alternate row can ultimately be removed, also alternate trees in the rows remaining; the permanent trees will then be 12 feet

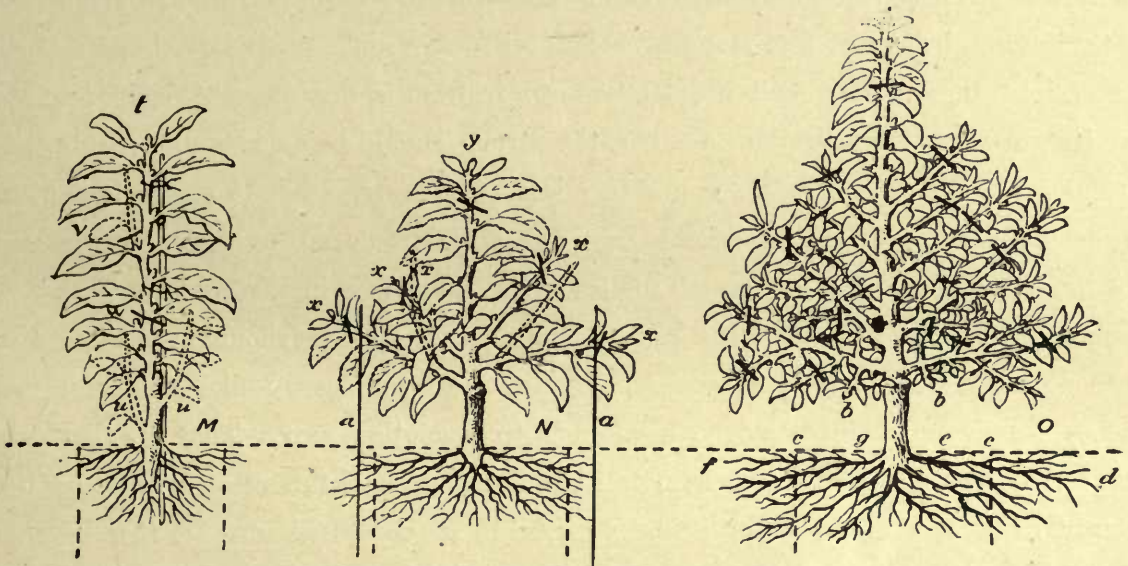


Fig. 5. FORMING ORDINARY BUSH APPLE TREES.

References:—*M*, tree in first growth (*t*) from the bud: *u*, latent bud growths; *v*, lateral; *w*, pruning point. *N*, tree in second year's growth: *x*, side shoots; *y*, leader; *a*, stakes. *O*, tree in third year's growth: *b*, spurs; *c*, cutting off roots; *d*, root liable to be broken at fork *e*; *f*, root subject to break at junction with stem *g*.

asunder. They may be safely transplanted up to the sixth year, or longer, if they have been root pruned. If they have not it is desirable to dig a trench round each, about the same distance from the stem as the branches extend, and detach all the roots; this will cause fresh fibres to form in the undisturbed part next the stem, and the trees may be removed with a mass of soil the autumn following. If this is done early, or as soon as the leaves can be shaken off, the trees will scarcely show any effects of the removal, as fresh rootlets will be quickly produced for the support of the expanding blossom and fresh growths in spring.

*Ordinary Bush.*—*M* (Fig. 5) is a tree with the first growth (*t*) from the bud, which is



usually inserted not more than 9 inches from the ground nor nearer it than 6 inches, in July. In this instance it had been inserted 6 inches from the ground, and the distance is suitable, as it allows sufficient space for surface dressings without burying the stock, so that rooting from the scion (or bearing portion) is prevented, for trees are not better under all circumstances on their own roots. Sometimes growths appear from latent buds on the stock: these (*u*) must be rubbed off, and any lateral (*v*) from the tree pinched at the first leaf and subsequently. In autumn, or by early March, the maiden tree is headed back to five buds (*w*). The following year a tree, indicated by *N*, is produced, having four side shoots (*x*) and a leader (*y*). If side growths push from these have them pinched at the first leaf, following this out through the season, and cutting them away in the autumn below the first stopping. This will leave some small base buds scarcely discernible, though they will ultimately form fruiting spurs. If the main branches are irregular one stronger than another, the strong should be depressed, securing them to stakes (*a*). Weaker growths should be raised. The leader is left 15 inches long at the winter pruning, and the side shoots have the points removed, as shown by the bars, the lower branches being as long as the leader. This tree is in admirable condition for removal, as indicated by the dotted lines. The object in all cases should be to obtain trees with as many fibrous roots as possible, but as most purchasers like much for their money, nurserymen often have to keep such trees another year. They are then quite as good as represented at *O*, namely, full branched and well furnished, with some fruit spurs (*b*). Now if the spade in lifting is driven in at the dotted lines (*c*) there is a loss of two-fifths of the roots, or if dug round it is possible such roots as *d* are broken off at the fork *e*, the equally important *f* being detached at *g*; other mutilations may also occur, so that when received the tree has as good as lost half its roots. It is better to cut the roots towards their extremities with a sharp spade than to tear them as above suggested. When a tree is taken up as advised it is not in the power of man to retain all the fibres, and some must be left in the ground. Now turn to the branches. These are long and many; yet some persons advise leaving them unpruned a year. The roots in their undisturbed state would certainly meet all demands of the foliage. But when a tree is removed the roots, as is apparent, are of necessity reduced, and cannot meet the demands of the tree with the branches unshortened. It may keep alive after it is planted, and even put forth a few short growths in a moist season, but through the evaporation from so much branch exposure during a dry summer, and so few roots to maintain the supply, the tree may collapse. By shortening the branches



evaporation is lessened, and better growth follows in consequence. If a tree is planted in the autumn, shorten the branches in the spring; if planted in the spring, prune it at once as indicated by the bars. The bush in this instance is only a low form of the pyramid, compact and symmetrical.

*Goblet-shaped Bush.*—The maiden tree, *P* (Fig. 6), which is to be trained in this shape, should be pruned to within one foot of the ground in winter (*h*). During the ensuing spring, three shoots should be selected from those which push as nearly as possible on the same level, rubbing off all the rest. Train the shoots at an angle of 45 degrees, but if they grow unevenly, depress the over-vigorous, raising the weakest, thereby securing three shoots of equal strength. In autumn cut each shoot back to

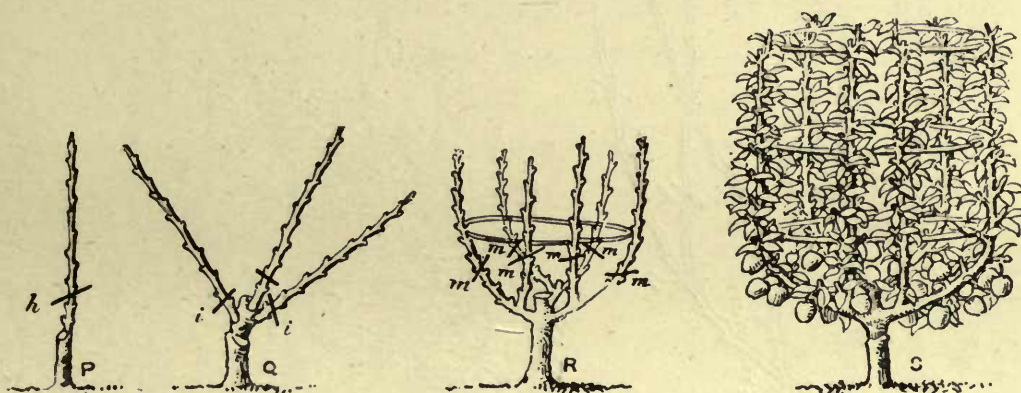


Fig. 6. FORMING GOBLET-SHAPED BUSH.

*References:*—*P*, maiden tree: *h*, point of pruning. *Q*, one-year-trained tree: *i*, pruning points. *R*, two-years-trained tree, showing shoots round hoop; *m*, pruning places. *S*, tree shaped and in bearing.

three sound buds as shown by the bars in *Q*. This, in spring, originates two strong shoots from each pruned branch. Train the six shoots selected as the best, removing any surplus growths. Towards the close of summer dispose the shoots regularly around a wooden hoop, 2 feet in diameter, as shown in the example *R*. After the leaves fall in the second year's training, shorten the shoots one third of their length and in the following summer select the most promising from the upper part of each branch, which train upright, pinching side-growths from the branches at six leaves to induce the formation of spurs. Secure the shoots to a hoop at such a height as will admit of their regular disposal as above represented, and the preservation of a symmetrical tree. Winter pruning consists simply in cutting back the summer pinched side shoots to within an inch of their origin, and shortening leading growths one-third.

The treatment in subsequent years is only a repetition of previous work until the desired height of the tree is gained, when it may be closely pinched. If a wider goblet-shaped



bush is desired, shorten each of the six shoots shown in the figure *R* to 6 inches (*m*), training two shoots from near the end of each the following year, disposing them round a hoop 3 feet in diameter, as shown in the figure *S*. The treatment of this is

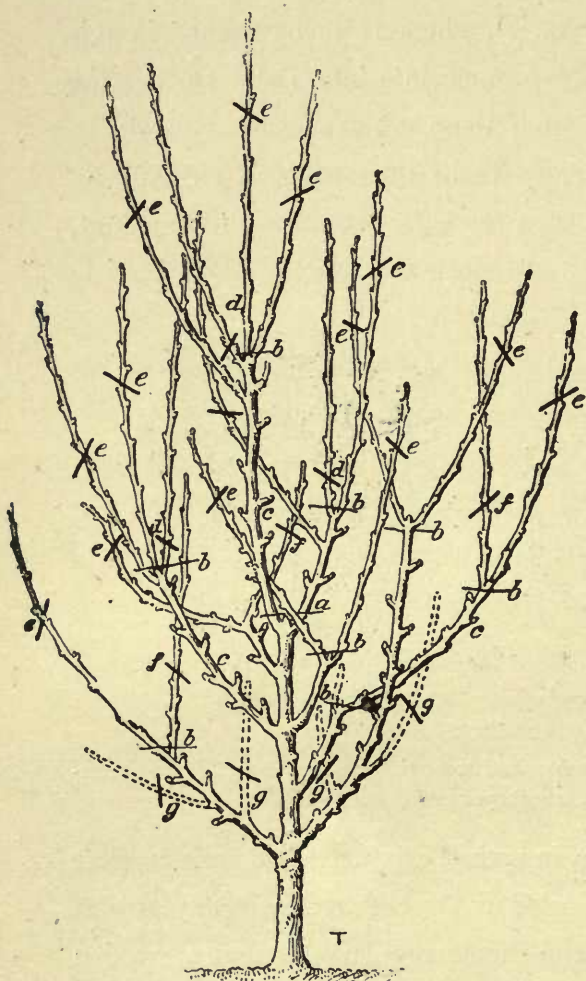


Fig. 7. OPEN BUSH, SHOWING PRUNING.

References:—*T*, tree two years from the maiden: *a*, maiden headed; *b*, second-year pruning; *c*, spurs; *d*, shoot cut back to form spurs; *e*, extension shoots and third year's shortening; *f*, shoots shortened to originate growths; *g*, latent bud growths.

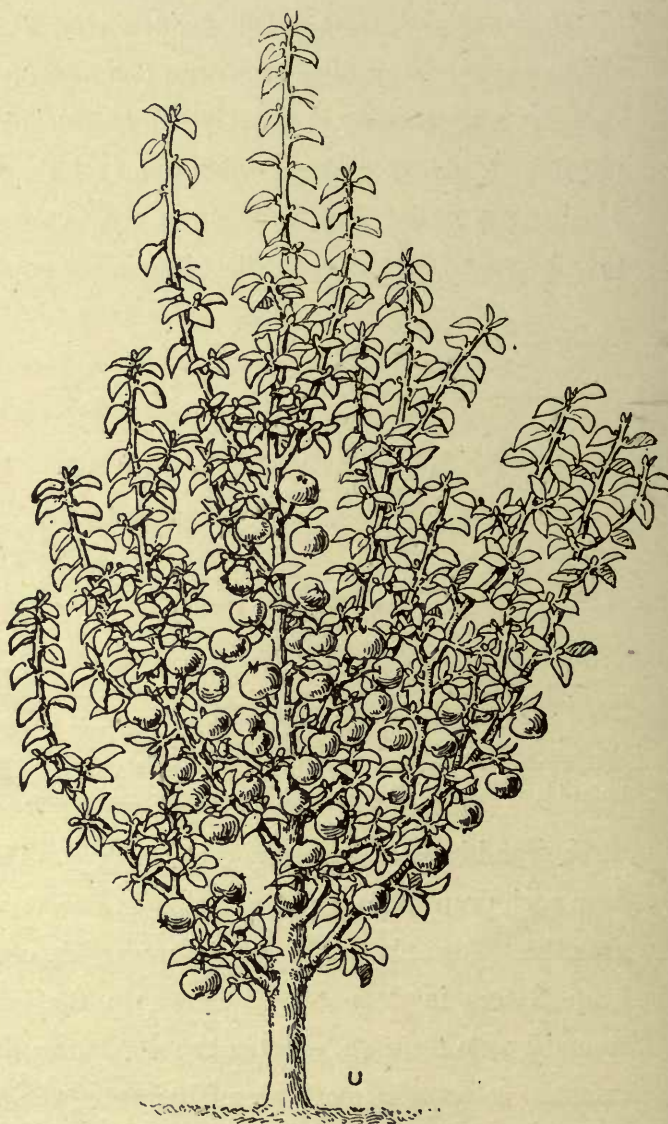


Fig. 8. OPEN BUSH IN FRUIT.

*U* shows the tree (*T*) in the following year—third from the maiden.

precisely the same in other respects as before described. It is a highly ornamental and productive form of tree, deserving of a place in well-kept gardens.

*Open Bush*.—*T* (Fig. 7) represents a tree two years from the maiden. As a maiden tree it was headed at *a*, originating the framework. In the autumn the growths made



during summer were headed to *b*, resulting in wood extensions from the upper buds or those immediately below the pruning, and the formation of spurs (*c*), some with fruit buds, the whole tree being as shown in the figure in the autumn of the third year. At the winter pruning the season's growths are thinned where too crowded or crossing others, some being cut to within an inch of their origin (*d*) to form spurs. Shoots advancing in the right direction merely have the immature points shortened to firm wood and a bold bud, pointing in the direction the growth from it is required to take the ensuing season. If outwards the bud must be outside the shoot, or if inwards, towards the stem of the tree. These may be termed extension shoots, as *e*, and any required to furnish shoots for filling vacant space should be cut back to five or six buds (*f*), not counting the small basal buds. Closer pruning of some of the lower shoots would have been necessary, but growths have been produced from latent buds at the base of the tree, which have lain dormant, not pushing until the tree had, by thorough establishment after planting, more sap transmitted than required, therefore causing the growths (*g*). These, cut back two-thirds their length, afford growths serviceable for furnishing the tree at the base, where it was hitherto rather naked.

These trees are chiefly employed for commercial purposes. The principles upon which they are managed are, first, allowing varieties to assume their natural forms; second, reducing pruning to a minimum, confining it to thinning out the shoots in June or early July where they cross, crowd, or otherwise interfere with each other, or impede the free access of light, air, and rain to the fruit and foliage, also shortening in September the shoots that have grown long to half their length, and those not required for extension to four or six good-sized leaves, for assisting the ripening of the wood and the development of fruit buds; and third, to reduce expenditure in manufacture to as low a figure as is consistent with placing such fruit in the market in a condition to command purchasers, and return as much interest as possible on the capital invested. Winter pruning is confined to shortening shoots not required for extension to three or four buds, and thinning where necessary so as to leave the primary branches 9 to 12 inches apart. The result of the treatment described is fairly portrayed in the fruiting tree, *U* (Fig. 8), the third year after planting. Such trees are equally adapted for garden and field culture. They are excellent for cottagers and persons generally who are not skilled in the art of training, and who cannot devote a great amount of time to their trees.

*Horizontal Training* (Fig. 9).—Select a maiden tree, *V*, with a clean, straight stem



moderately strong, as such is preferable through the buds not being too widely distributed. Cut it back to 1 foot from the ground as shown by the bar *i*; this should be done from the fall of the leaf to the middle of February or beginning of March, during mild weather.

Shoots will be produced in spring from the three uppermost buds. The highest of these (*j*) train upright, the other two respectively to the right and left, and at an angle of  $45^\circ$ , as shown at *k* and *l* in the second tree (*W*). If one grow stronger than the other, as *k*, depress it to *m* or lower, and raise the weak *l* to *o* or higher, so that shoots as nearly as possible of equal strength may be produced. In autumn the upright shoot should be cut

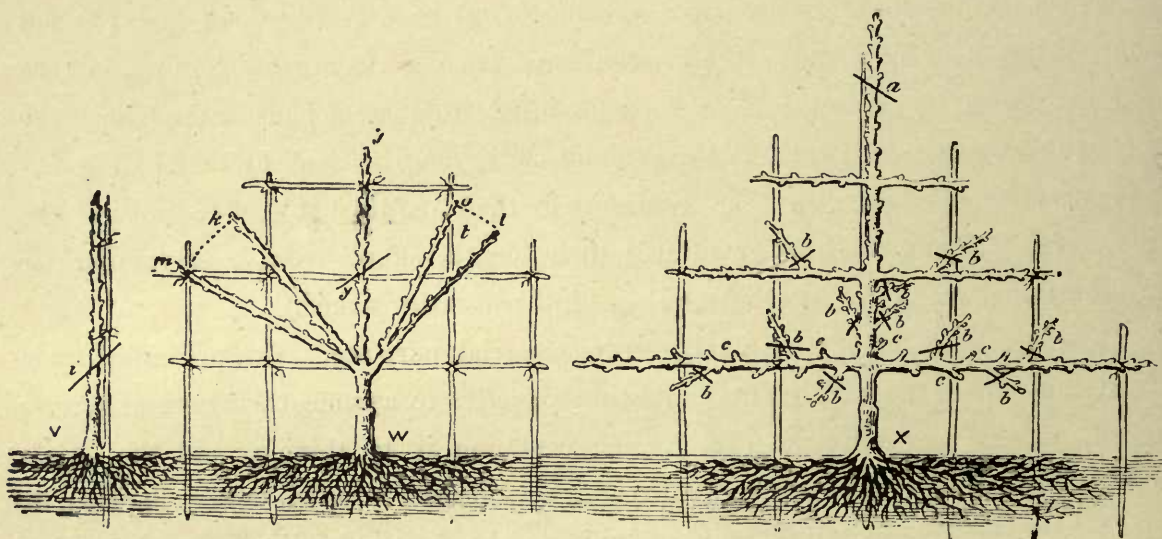


Fig. 9. HORIZONTAL TRAINING. (Scale:  $\frac{1}{2}$  inch=1 foot.)

*References*:—*V*, maiden tree; *i*, point of heading. *W*, tree in first year's training; *j*, leader; *k*, strong shoot to be depressed; *l*, weak shoot to be raised; *m*, strong shoot depressed; *o*, weak shoot raised; *y*, point of shortening leader. *X*, tree in autumn of second year's training; *a*, point of cutting back leader; *b*, shortening laterals to two buds; *c*, stubby shoots or spurs.

to within 1 foot of the point to which it was first shortened, or as near that as a bud, with two others below it, eligible for horizontals will permit. As 1 foot is the distance to be allowed between the horizontals, the buds left to produce them should be a little below the line along which they are ultimately to be trained. This will be readily understood on reference to *W*, in which *y* is the place where the upright shoot is cut to the horizontal line. As the side, particularly the lower, branches cannot be too strong they should not be depressed or brought to the horizontal line for another season.

In the second year of training the leaders of the main branches are not to be stopped, but any side shoots should be pinched at the third good sized leaf, not counting the one



or two small leaves at the base of the growths. There may push what are known as sub-laterals, and if so pinch them to one leaf, and subsequently as growth is made. This will throw all the vigour which would otherwise be expended in useless wood into the leaders. Those originated through cutting the leader to *y* the previous autumn or winter are to be taken respectively to the right and left, and that of the upright in a vertical direction; the side shoots at an angle of  $45^{\circ}$  as in the first season. Other growths may appear on the central stem besides the three required; they should be pinched in the season of origination, and afterwards as directed for growth from the side branches. This pinching of the side growth will increase the vigour of all the extension shoots, particularly the upright leader, which if allowed to grow unchecked may push laterals from its upper part through excessive vigour consequent on the restriction of the side growths from last year's wood. There are two ways of utilising the vigour, first to let the side and other lateral growths extend with a view to the increase of roots and corresponding increase of growth the following year; or second, to pinch the leader at a point where it would be necessary to cut it back to in autumn to originate the next pair of horizontals and a fresh leader. The latter is advised, as by it a year is gained, and if effected in July or earlier the leader and side growths will have time to make and mature a good growth before the fall of the leaf. If more growths result from the topping of the leader than those named, pinch them at the first leaf.

In the autumn of the second year's training, the tree treated as stated, will, when the growths are brought down to the positions they are to occupy, somewhat resemble *X*. To effect the proper training of the growths, upright stakes must be put in with horizontal pieces lashed at the crossing, so as to form an improvised trellis for tying the growths to as required, as is shown in the figures. The leader should be cut back to *a*, and the laterals (*b*) shortened to two buds, or to be not more than an inch in length. Short, stubby shoots or spurs (*c*) are not to be shortened, as they are the parts from which the fruit is chiefly produced, some already having formed fruit buds.

The following year's treatment is simply a repetition of that of the preceding year, only it is not desirable to train the side branches at an angle of  $45^{\circ}$  as they will have acquired sufficient vigour; therefore, they may be trained horizontally, and if the leader is also strong, two sets of horizontal branches may be originated each year. The above is undoubtedly the simplest mode of forming horizontal trees for walls or espaliers, as once the branches are started there can be no doubt in training them. The growth is easily under command, the sap equally distributed, the branches are exposed to the light, and



though the distance of 1 foot between them may seem great at first, it is not more

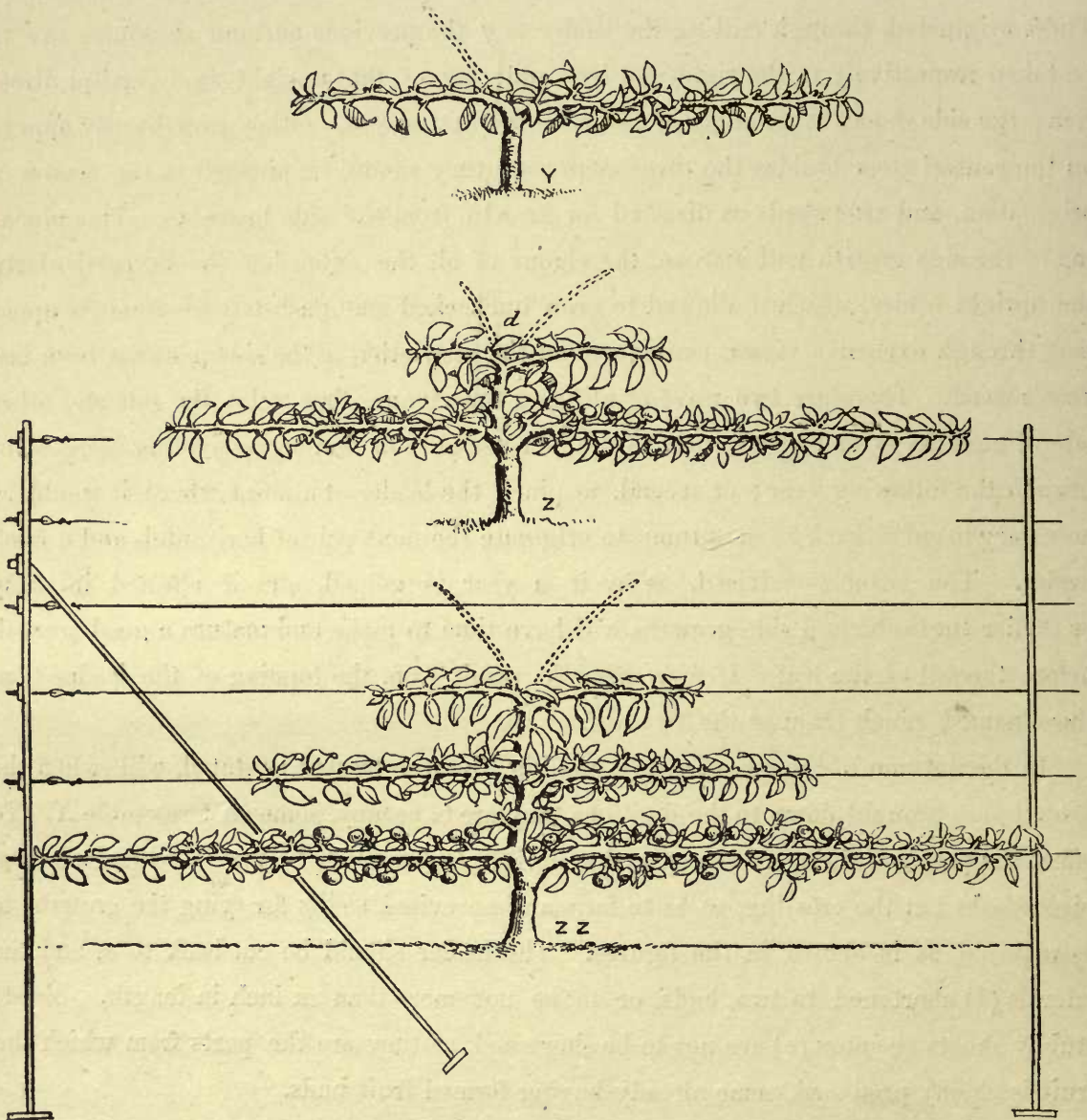


Fig. 10. HORIZONTAL PALMETTE WITHOUT HEADING. (Scale :  $\frac{1}{2}$  inch = 1 foot.)

*References* :—Y, tree in summer following depression of pliable maiden tree to right, a growth being taken from the bend to the left as shown by dotted lines and depressed as represented. Z, tree in second year of training ; d, outline of first and second growth. Z Z, third year of training.

than is ultimately necessary for the full development of the leaves and spurs, their due exposure to light and air, and the proper maturation of the fruit.

*Horizontal Palmette* (Fig. 10).—To form a Horizontal Palmette, select a vigorous



well-situated shoot from the bend of a young tree which has been trained as shown for forming horizontal cordons on page 22, *E* (but without heading), and now represented as growing (*Y*), training the new growth upward, as is indicated by the right-hand dotted line, *d*, in *Z*. Continue the extension from the end of the right-hand branch, pinch all side-shoots beyond three or four leaves, and suppress subsequent growths to one leaf till September. The upright shoot will then make strong growth, and having extended 2 feet, depress it to the horizontal line 1 foot from the ground, as represented in *Y*. The following spring take a shoot from the bend, and when it has grown 2 feet, depress it; then if this is done in June, or not later than early July, a shoot or shoots will push from the buds at the bend, in the direction of the left-hand line, *d*. Select the best, rubbing off any others, and the season being favourable, it will make a foot or more of growth, and mature the wood and buds to the extremity. If the growth is brought to the horizontal line in September, the tree will have two pairs of branches. If the upright has not grown sufficiently long to depress by midsummer, allow it grow upright until the autumn; then bring it down to form the second right-hand branch, originating that to the left the following spring, similar to that of the preceding year.

Assuming, however, that the upright shoot has sufficient vigour, another pair of lateral shoots may be originated. With proper attention to summer pruning, preceded by disbudding, the rubbing off of probable gross shoots and those unwise to retain, the tree will have the promising appearance represented in *Z Z* in the autumn of the third season after planting. The object of training in this form is to dispense with the knife as much as possible, not allowing parts to be formed that must afterwards be removed as unnecessary, and even useless for the production of fruit. Espalier trees, formed in either of the two methods described and eventually trained to wires as shown, are easy to manage, fruitful, ornamental and suitable in divisional lines in gardens.

*Upright Six-branched Training* (Fig. 11, next page).—*A* represents a maiden tree, with the first growth secured to part of the stock left above the junction of the stock and scion, which part is to be cut away to the dotted line in the autumn, and the tree shortened to 1 foot from the ground at the bar. In spring the shoots from the uppermost buds should be examined, and the two most promising and situated nearest to each other selected for training, all others being rubbed off. Train the pair upright, with a curve at the base, leaving about 18 inches between them. If one grow stronger than the other depress it, whereby the weaker one will gain strength. They should, as far as possible, have an equality of vigour as shown in *B*.



In the autumn of the first year's training, the shoots, if more than 3 feet long, as they should be, are to be depressed to a horizontal position, taking care not to break them, and shorten each to 2 feet 6 inches. When the buds break in spring, the most promising nearest to the points at which the uprights are required, as well as one from each extremity, are to be retained. All others are to be pinched to three leaves, and to one subsequently as fresh growth is made. Thus for furnishing six uprights three shoots on each side of the stem should be allowed to grow, the first 6 inches from the stem, the next a foot from it, and so on as shown in *C*. The growths reserved should be trained upright at the proper distances,—a foot apart. If one grow stronger than another, stop it when it has extended 13 inches, and the sap will be diverted into the weaker

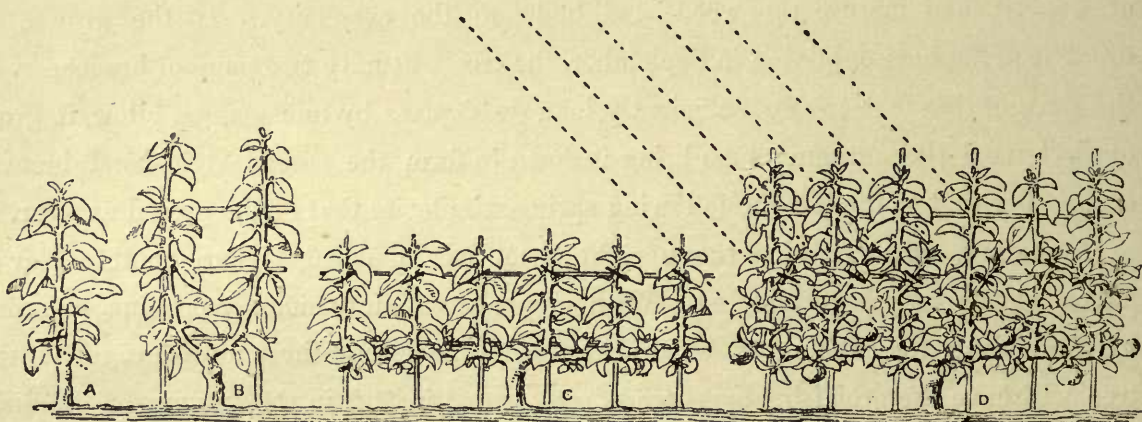


Fig. 11. UPRIGHT SIX-BRANCHED TREE. (Scale:  $\frac{3}{8}$  inch = 1 foot.)

*References* :—*A*, maiden tree. *B*, tree in second year. *C*, tree in third year. *D*, tree in fourth year ; dotted lines indicate training diagonally.

shoots and they will gain vigour. Shoots will result from the stopping ; train the leaders upright and pinch all others at the third leaf, cutting these further back in autumn after the leaves fall to within an inch of their base, and shorten the uprights to 13 inches. Growths will proceed from the upper parts of the shoots the spring following. Train the leaders upright, and pinch all others at the third leaf, and to one afterwards of subsequent growths as in the preceding year ; a tree of uniform vigour will then be secured, well furnished with spurs as well as a little fruit, all being represented in *D*, the fourth year's growth from the bud.

If trees with less than six branches are desired, the two shoots may be cut back to 2 feet each for originating others to form a five branched tree, a most undesir-



able form, as the central one is vertical with the stem, and the sap flowing most freely in the first upright channel the shoot receives more than its due share, whereby the two on each side of the stem are proportionally weakened. For a four branched tree the two shoots in the first autumn after their production may be cut back to 18 inches on each side of the stem, taking up two shoots on each side of it, treating those and other growths similar to those of the six-branched tree. The distance between the uprights should be 1 foot.

Oblique six-branched trees only differ from the upright in having the branches aslant, usually at an angle of  $45^{\circ}$  from the perpendicular or base line. This is shown by the dotted lines in *D*. It allows a greater extension of the principal branches, and the depression insures distribution of sap more equally than in trees with the branches trained upright. All the forms mentioned are good as espaliers, secured to trellises, or as wall trees.

*Cordon Training*.—The cordon system of training fruit trees has been long practised on the Continent. It was introduced into this country by the late Mr. Thomas Rivers nearly half a century ago, and has been since improved and perfected by his son, Mr. T. Francis Rivers, and other cultivators. The main feature of the system is its simplicity, and its chief characteristic consists in admitting of a large number of trees being cultivated in a comparatively small space. These are considerations that weigh with those not acquainted with intricate forms of training, and not having a large extent of ground that can be devoted to fruit trees. The cordon system is therefore particularly suitable for small gardens, especially suburban; but similar trees trained on this method are equally eligible for gardens of any extent. Wherever there is wall, paling, or rail area required to be covered, or means of erecting trellises for the support of trees, the cordon system commends itself to all growers of fruit.

*Horizontal Cordons* (Fig. 12, next page).—The form under notice is very appropriate for training along the sides of walks, or to form an edging or boundary to fruit-tree quarters. To form the Single Horizontal Cordon, select a maiden tree, moderately strong, and without side-growths. Such as is received from a nursery will be similar in stem and roots to *E*. Shorten the tree one-third of its length, calculating from the bud or graft, and cut away the radical or tap root, so as to prevent deep penetration and encourage the formation of fibres near the surface. Cut the other large roots, which were bruised and broken in lifting back to sound parts, when the tree will appear as in *F* and *G* after planting. In *F* the tree is upright; this occasions a sharp bend in bringing the



stem down to the horizontal line and is not good, as, irrespective of probable damage to the bark and wood tissues, it has a tendency to encourage shoots from that part, whereby

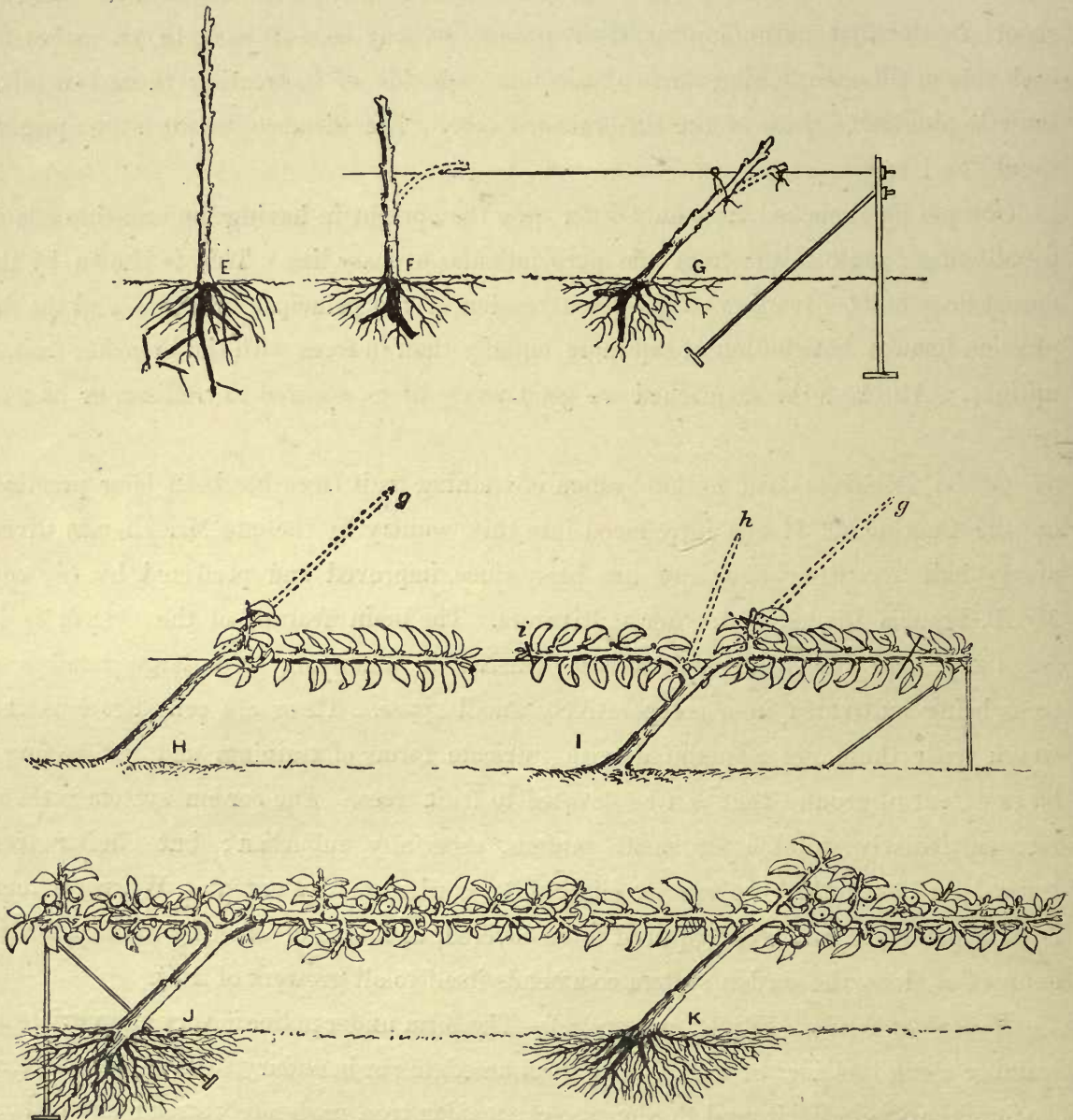


Fig. 12. HORIZONTAL CORDONS. (Scale :  $\frac{1}{2}$  inch = 1 foot.)

*References*.—*E*, maiden tree as received from a nursery. *F*, the tree, root pruned, shortened, and planted upright. *G*, maiden tree planted diagonally. *H*, tree in first year's training: *g*, shoot trained diagonally in summer. *I*, training the end tree: *h*, direction of terminal shoot in summer; *i*, terminal shoot depressed. *J*, terminal tree in third year's training. *K*, tree in third year's training, showing overlapping.

the horizontal part is impoverished. By planting at an angle of  $45^{\circ}$ , or diagonally, *G*, the objectionable bend is dispensed with, and the sap flows freely in unimpaired



channels. The stem may be brought down to the horizontal position, as indicated by the dotted lines, when the buds commence swelling.

The spring after planting shoots will grow from the stem; all of these to the height of the training wire should be rubbed off, a strong leading shoot from the upper part being trained forward diagonally, (*g*) and all others, making five or six joints of wood, pinched to three or four leaves, as shown by the bars in *H* and *I*. Exception must be made of a shoot in rubbing off those on the stem, when the tree is near the end of the wire (*I*), selection being made of one well disposed for training in the direction of the terminal post, but training it upwards (*h*) until the end of summer, when the

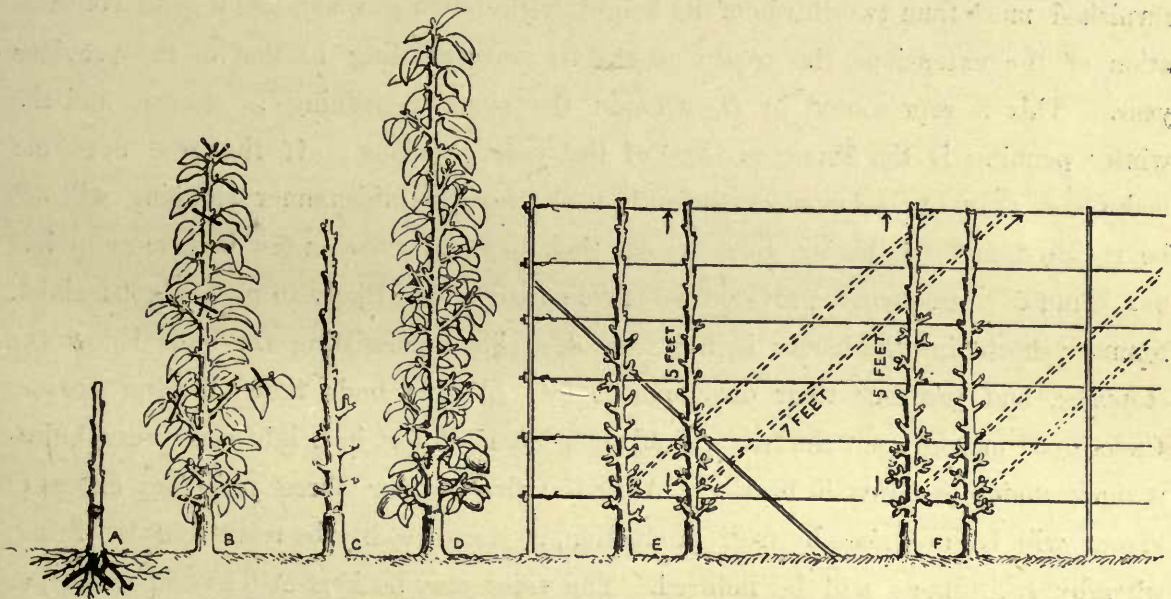


Fig. 13. SINGLE VERTICAL CORDON TRAINING. RESULTS IN DEPRESSION.

*References* :—*A*, pruned maiden tree. *B*, tree in leaf, second year. *C*, same tree, pruned in the autumn. *D*, fruiting tree, third year. *E*, trees planted 18 inches apart, for depressing diagonally so as to be 1 foot between branches. *F*, trees showing difference. (See pages 24 and 25.)

trees are to have their proper position, as shown in the figures. At the winter pruning the continuation shoot is shortened one-third of its length, cutting at the bar, whilst the terminal shoot (*i*) merely has the point cut off near the post. Stopped side shoots are at the same time cut back to the nearest good bud of the base of each stem.

In the September of the third year's training the trees will have grown and overlap the space allotted to each, 6 feet, as shown in *J* and *K*. The extension shoot of the former, where it overlaps the latter, should be grafted on it the following spring, whereby a continuous cordon line of trees will be secured.

*Single Vertical and Diagonal Cordons* (Fig. 13).—*A* is a rather weak but clean healthy



maiden-tree, pruned to half the length of the scion growth, root pruned and planted. In spring shoots will push from the uppermost buds. The strongest must be retained as a leader, securing it to a stake to prevent breakage, and when it has grown a foot, pinch out its point. If this is effected by or before midsummer it will push again. Reserve the strongest growth, training it upright, pinching the others to the third leaf. Shoots on the previous year's wood treat similarly. The tree so treated will have in September the appearance of the figure *B*. When leafless and winter-pruned it will be similar to *C*, sturdy and furnished with blossom buds on the two-year old wood.

In late summer of the second year after planting we have a tree bearing a few fruits, furnished more than two-thirds of its height with bearing wood, and a good continuation of the extensions, the treatment exactly corresponding to that of the previous year. This is represented in *D*, wherein the summer pruning is shown, and the winter pruning is the same as that of the year previous. If the tree does not make more than 12 inches of extension in each year, the midsummer stopping will not be required, and the leader must be cut back to about a foot, a few buds more or less not being of consequence, provided we make sure of a bud likely to push a good shoot. Summer shortening the leader is, however, desirable for assisting the buds below the stopping, and insuring their development into blossom buds the following season. Under good management the tree will advance about 2 feet in height each year, unless it shows undue precocity in bearing. After the first two or three years any excess of vigour will be overcome by fruit production, or it can readily be restrained by lifting, whereby fruitfulness will be induced. The trees may be kept at 6 feet in height, or allowed to grow to any altitude desired, the needful support being afforded by stakes, trellises, or walls. Trees in this form may be planted 1 foot apart against walls, but in the open they are best grown 18 inches asunder, and may be in-lines  $4\frac{1}{2}$  feet apart, trained to rails or wires 6 feet in height, thus presenting a fruiting surface four times greater on the same space of ground than horizontal cordons.

Although upright cordon trees may be planted 1 foot apart for covering walls and other opaque surfaces, it may be as well to point out the difference between the upright and diagonal. In the trees *F*, page 23, the distance is 1 foot and the full height 6 feet. The trees have reached the height of the trellis, and are growing vigorously. The grower, to secure further extension, brings them down to the dotted diagonal lines and gains 2 feet, or a length of 7 feet instead of 5 feet. This is satisfactory in one way, but it cuts the other most disastrously, inasmuch as the trees in the diagonal lines are



only 9 inches asunder. This is fatal to successful cropping, as the trees have not sufficient light and air through the crowded growths. What is gained in length is lost in breadth, so that trees trained with the branches at equal distances have an identity of fruiting surface whether trained upright or diagonally. If the trees (*E*, page 23) are planted 18 inches asunder it admits of 1 foot between the lines when brought down to the diagonal position, or an increase in length of 2 feet each, but a decrease of 6 inches between the branches. This holds good in all diagonal training, a geometrical term indicating a line extending from one angle to another of a quadrilateral figure, and

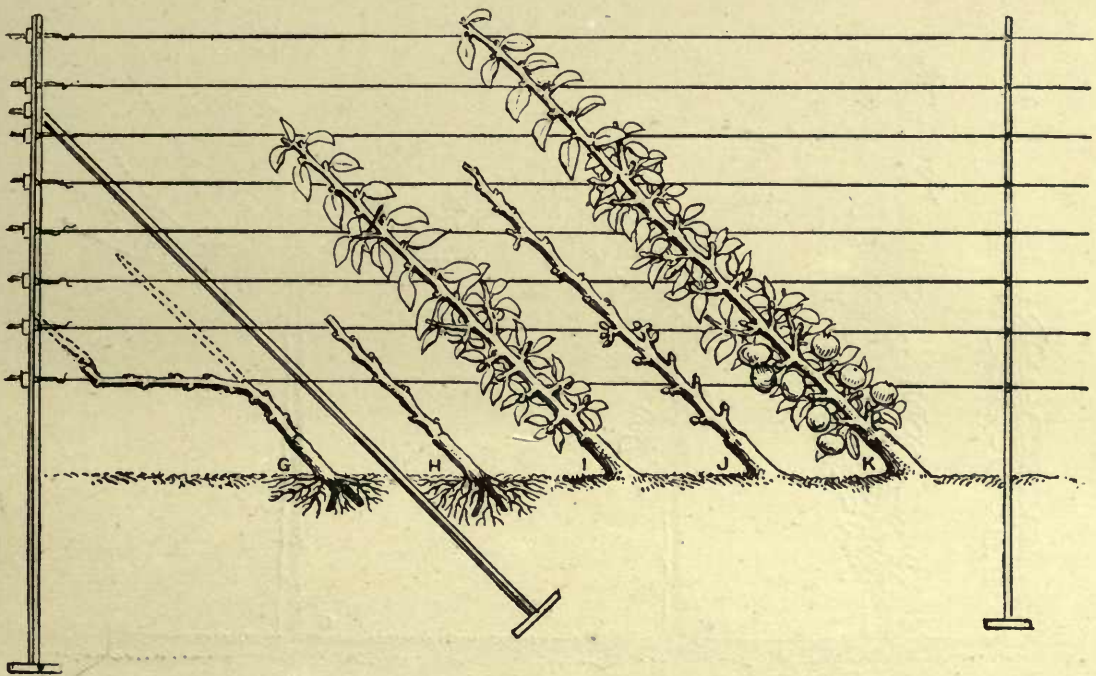


Fig. 14. SINGLE DIAGONAL CORDON TRAINING. (Scale:  $\frac{1}{2}$  inch=1 foot.)

References :—*G*, terminal tree. *H*, maiden tree, pruned. *I*, tree in second year of growth. *J*, same tree, pruned in the autumn. *K*, tree in fruit, third year.

dividing a square into two equal parts, the perpendicular and base line being equal, consequently the angle is  $45^\circ$ . Oblique training differs from the diagonal in that the line of branches may be at any angle, but decreasing the width between the branches as they are elevated from a horizontal, or depressed from an upright position. Diagonal is a definite term, oblique indefinite, meaning any deviation from a right line, not direct, not perpendicular, not parallel, but, in plain English, aslant.

*Single Diagonal Cordons*.—Trees trained in this form (Fig. 14) have the sap more equalised than in the upright, consequently have more vigour imparted to the lower parts



than obtains with the vertical, which are liable to become bare or weak at the bottom and have a superfluity of shoots at the top of the trees. The equalisation of vigour is the main feature of diagonal training. The trees require to be planted 18 inches asunder for walls, but for espaliers the trees should be planted 2 feet apart. *G* is a terminal tree pruned and planted, the dotted lines indicating the direction of the shoots the ensuing year. *H* is a similar tree, also branch and root pruned, and planted diagonally. The treatment does not differ materially from that of the vertical, only the necessity for stopping the leader is not so great, but it is well to practise it in view of



Fig. 15. LOW STANDARD TREE. (Scale:  $\frac{1}{2}$  inch = 1 foot.)

References:—*L*, maiden tree. *M*, tree in second year: *p*, point of stopping leader; *q*, point of shortening in autumn. *N*, tree in third year: *r*, point of shortening in autumn. *O*, tree in fourth year: *s*, point of winter pruning.

well developed buds. The summer treatment is shown by *I*, and the tree after the winter pruning by *J*, and in the early autumn of the second year after planting the general resemblance of the tree will correspond to *K*. This is a very desirable method of training, insuring early bearing, with productive crops of the choicest fruit under favourable climatic conditions. If it is desired a cordon may have two branches from the main stem. If these are trained upright it is known as a double vertical cordon; if slantingly, as a double diagonal cordon. The references are to figures on the preceding page.

*Low Standard Trees* (Fig. 15).—*L* is a maiden tree with foliage. It is necessary to



secure the growth to a stake to prevent damage from wind, and a perfectly straight upright stem. Heading is not advisable as it causes a kink in the stem more or less unsightly. The second year the tree should have a stout stake to the height of *p*, in *M*, and as the growth will extend beyond it, the top of the tree may be pinched off to not less than six leaves from where the winter pruning is to take place, at the bar, *q*, to originate the shoots for the head of the standard the following year. Stopped at *p*, early in June, or when sufficiently advanced, laterals will be formed as indicated by the dotted shoots and leaves. These can be pinched at the fifth or sixth leaf if the growth exceed that length. Side shoots will also form on the stem, and may remain, as they will help to thicken it, and in September be shortened to four or six leaves according to their length. These at the winter pruning are to be cut away close to the stem, and the head cut off above three good buds at the bar *q*. In the following, or third, year three shoots will issue from the buds immediately below; encourage those by rubbing off all others for a time, but when the three are well in advance any that proceed from the stem may grow, keeping them subordinate to the others, for forming the head, yet present to use up any excess of sap, which at the same time strengthens the stem and prevents the head growths from becoming unduly vigorous. This is represented in *N*. It is essential that the three shoots be as nearly as possible equal in strength. If one have more vigour than another it should be depressed, which can readily be effected by a bent stick secured to the stem, whereby the growth can be regulated through depression or elevation as strength or weakness necessitate. Growths from the stem should be pinched to five or six leaves in June, still closer in September, and cut clean away at the winter pruning; each growth of the head (*r*) to be cut back to three good buds at the same time.

In the fourth year take two shoots from each shortened branch, rubbing the others off, with all growths from the stem, and a tree will be formed as in figure *O*. Any laterals pushing from the shoots stop at the first leaf. Shorten each shoot to 6 inches at the winter pruning (*s*), observing to make sure of two good buds as the termination of each. In the fifth year two growths should be encouraged from each shoot on a level with each other, sideways, rather than one above the other. The direction of the growths is shown by the dotted lines. The treatment of these, and the side shoots, is the same as is stated for Open Bush Trees (page 14), both in the current and subsequent years. These low-stemmed, compact-headed standard trees are by some preferred to pyramid or dwarf forms, as being better adapted for intermediate cropping



with vegetables or bush fruits between the trees. In three more years the tree will be in the satisfactory condition represented (Fig. 16). It is productive, because the branches

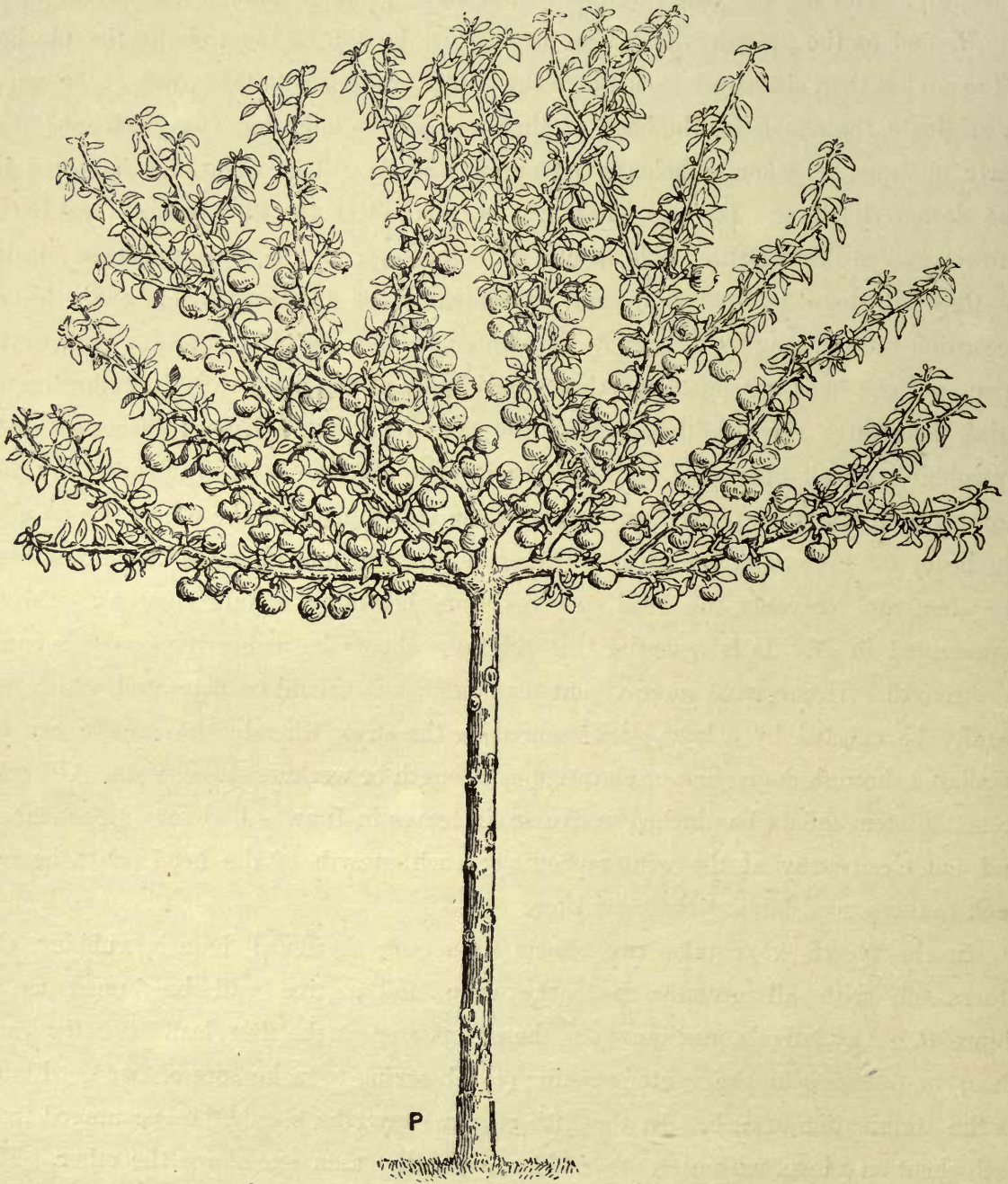


Fig. 16.—LOW STANDARD IN BEARING.

are thinly disposed, thus admitting the sun and air to the leaves right down to the base of the branches. The stem is 4 feet high, the head, or bearing part, about the same, and nearly 7 feet in diameter.



*Other Forms of Trees.*—Apple trees are shaped and trained in various other ways besides the foregoing. They will, however, be found modifications only, and, as a rule, offer no material advantage. Exception may be taken to trees that grow too luxuriantly: then pendulous or downward training may induce fruitfulness; also trees that grow weakly may produce finer fruit by training the branches upright. The Palmette Verrier, or a combination of both the horizontal and vertical forms of training, originated with the French, and is considered to offer certain advantages over horizontal training. This and other modifications of fan and horizontal training will receive attention under some other fruits. We would, however, impress on all cultivators that the secret of fruitfulness is not to be found in fanciful systems of training, but at the roots of trees, with the thin disposal of their branches. Expedients in training are of little avail where the more important points of selecting stocks, root management, and correct methods of pruning are ignored.

#### GENERAL MANAGEMENT OF APPLES.

*Pruning.*—Manipulations require to be performed according to the individual condition of the trees as influenced by soil, climate, space, and mode of culture. Growers should study the trees they cultivate. Some trees naturally grow compactly, whilst others that grow rampantly are made sturdy by firm soil, also summer and root pruning, and it should be borne in mind that pruning always produces certain effects, namely—1, close pruning in winter induces growth; 2, judicious summer pruning causes the tree to throw out spurs and blossom-buds; 3, root-pruning arrests growth and promotes fruitfulness; 4, thinning crowded spurs and blossom-buds favours a good set of fruit. Prune in winter for wood; prune in summer intelligently for fruit. Some apples bear at the tips of the branches, such as Ashmead's Kernel, Cornish Gilliflower, Golden Noble, Harvey's Wiltshire Defiance, Russian Transparent, Irish Peach, Northern Spy, and Yorkshire Beauty. Prune such sparingly, thinning the growths preferably to shortening them, unless interfering with the symmetry and strength of the tree.

The essential pruning a tree requires depends, other conditions being favourable, on the mode of culture. This is given under the different forms of trees, and these are what is termed—1, restrictive; 2, extension. The restrictive system comprises trees trained in pyramid, bush, goblet, fan, horizontal, upright, and cordon form. The summer pruning of these forms of trees is given in Vol. I., pages 163-165, illustrations, page 164; winter pruning, pages 169, 170; pruning spurs, pages 170-172, illustration,



page 171. Lifting fruit trees, pages 172, 173, has special application to trees on dwarfing stocks, and those limited to space. Extension (so called) forms consist of cup, Vol. I., pages 179, 180; forked, pages 180-183; open bush, and half-standard, also standard. The principles upon which these trees are pruned will be found under "Open Bush," present Vol., page 14, and root-pruning as applicable to these forms is given in Vol. I., pages 174-178.

*Manuring.*—Cogent remarks on this subject are given in Vol. I., page 51, commencing "Applying Manures," and following on to page 56, and have particular application to apple trees. Reference may be made to the artificial manure alluded to under "Canker," Vol. I., page 234. Generally apple trees do not require such liberal supplies of manure as some other fruits do, but when grown in poor soils, or when they bear too profusely so as to exhaust themselves, some decomposed manure, about 6 bushels per square rod, should be spread on the surface in autumn and left there, or be merely pointed in early in spring. This is almost a necessity annually in light, shallow soils, and where the trees yearly bear heavy crops of fruit.

Manures, however, are of no use without a due amount of moisture in the soil. The rainfall in most localities and seasons is sufficient to render solid manure and artificials available as food in soluble or fluid form. Mulching (Vol. I., page 57) assists apple trees immensely in light, shallow soils. It should be applied soon after the fruit is set, and be added to from time to time through the summer up to September. An inch or two in thickness at once is all that is necessary, and heavy soils only require mulching on the setting in of dry, hot weather to preserve the moisture in the earth and prevent parching and cracking. Good friable loams, having a surface of good tilth, do not usually need mulching.

Liquid manure (Vol. I., page 56) aids trees carrying full crops to perfect them, the fruit becoming larger and more juicy. To benefit the swelling, liquid stimulants should be applied in the early stages, and continued as occasion requires, until the fruit is full grown. Liquid manure should, when possible, be given after rain; it is simply wasting rich liquid when it is poured on parched and cracked soil; but the soil having its interstices closed by a thorough watering, liquid manure may then be applied advantageously. It may also be given to weakly trees whilst dormant, as a means of soil enrichment. One or two good soakings of strong liquid in winter assist trees to swell their crops in summer, but continual applications of slops and liquid manure render the soil sodden and sour.



Watering (Vol. I., page 57) judiciously in periods of heat and drought may save the foliage from red spider, and the fruit from becoming mealy. Watering outdoor fruits, especially the apple, is not commended as a rule of practice; but it is an excellent plan to apply water before the soil becomes too dry for healthy growth, never waiting until the tree shows signs of distress. Hot and shallow soil require careful attention in respect of watering. Apple trees prefer a cool and moist soil, and soils not naturally retentive must have natural deficiencies made good by artificial waterings and mulching. This particularly applies to trees growing against walls and fences.

Syringing the trees in the evening during dry periods saves them from many disasters incidental to their growth in hot soils, namely, small fruit, rusty foliage, dying back at the tips of the branches, and blossoms annually cast without setting fruit. Clean and healthy foliage is indispensable to perfect bud formation. Trees suffering from drought at the roots, and having their leaf juices abstracted by parasites, always form imperfect blossom buds.

The following subjects have received a legitimate share of attention, and need only referring to as applicable in essential points to apples: birds and buds, Vol. I., pages 190, 191, the bullfinch being the chief destroyer of apple tree buds; preserving buds, Vol. I., pages 191-192, the means needing to be applied later than for most other fruit trees, as apple buds are taken last; protecting blossom, Vol. I., pages 193-197, seldom carried out effectively, but well repaying the trouble; thinning fruit, Vol. I., pages 197-200, to which attention should be given, as many trees that produce indifferent fruit would have their crops greatly improved both in appearance and quality by judicious thinning; perfecting and protecting fruit, Vol. I., pages 200-202. These matters are of the greatest importance, for the choicest specimens may be deteriorated in value by attacks of wasps, and the crops imperilled by the onslaughts of the blue titmouse, and in some cases blackbirds commit great havoc on the tender-fleshed apples, such as Worcester Pearmain and Peasgood's Nonesuch.

Tests for gathering, with instructions, are given in Vol. I., pages 202, 203, and special attention is given to apples in remarks on storing and fruit-rooms, Vol. I., pages 203-214.

#### GROWING APPLES UNDER GLASS.

In cold, wet, exposed, and elevated localities the choicer varieties do not attain the size, colour, and clear skin in their fruits that is desirable. Indeed, apples grown under



glass are much larger, higher-coloured, and clearer-skinned than those of similar varieties grown against walls, and other aids to climate. Exhibitors take advantage of this in producing many handsome specimens seen at shows. The choicer tender-fleshed American varieties grown under glass in this country are superb, excelling imported fruit in size, colour, bloom, and quality. Tender-fleshed, richly-flavoured apples, grown in a glass-house are particularly suited for persons inconvenienced by a hard-fleshed fruit, and this mode of culture is specially applicable to localities that are subject to smoke and dusty deposits near towns, also where the fumes of factories and chemical works have a bad effect on vegetation.

Varieties of apples suitable for growing under glass, named in order of succession, to insure a supply of fruit from August to April inclusive :—

Red Astrachan.	Gravenstein.	Ribston Pippin.
Williams' Favourite.	Wealthy.	Gascoigne's Seedling.
Benoni.	Bismarck.	Reinette de Canada.
Cardinal.	Beauty of Waltham.	Baumann's Reinette.
Washington.	Melon Apple.	King of Tomkin's County.
Emperor Alexander.	Cox's Orange Pippin.	Peck's Pleasant.
Peasgood's Nonesuch.	Buckingham.	Northern Spy.
American Mother.	Sandringham.	Calville Malingre.

*Houses.*—Simple inexpensive structures, as span and three-quarter span, answer when the trees are grown in pots, but when planted out it is advisable to have the roof lights movable. This admits of the trees being exposed to the invigorating influences of the autumn rains, and ensures complete rest in the buds during the winter. Severe frosts do not injure the trees provided their growths are well matured.

The timber used in constructing the house should be sound, thoroughly-seasoned red deal, and the roof lights glazed with 21 ounces sheet glass, thirds, in panes not less than 10 inches wide, 15 ounces, thirds, answering for the side lights. The top and side lights need not be removable, but the roof lights (*b*, Fig. 17) must be portable.

The trees for furnishing the house may be cordons—single or with from two to six branches, planting them at the sides of the house, as in *Q*, and training them to a wire trellis 1 foot from the glass, with the branches not less than 1 foot apart. This arrangement affords the finest, but not the most fruit. The borders need not be wider at first than between the outside walls (*t*) and the pillars (*g*).

Another plan of furnishing the house consists of cordon trees disposed along the sides, trained part of the way up the roof, as in *Q*, with vertical trellises cross-wise of the house between the pillars (*d*), one trellis under each rafter, 4 feet apart. Cordons, upright



six-branched, fan, and horizontally-trained trees are suitable for the cross trellises. One fan or horizontally-trained tree suffices for each trellis, or two upright six-branched cordons. By this method four times the extent of bearing surface is obtained than by the roof trellis system. Excellent fruit for general use is borne by the cross-trellis trees, whilst the cordon trees trained part of the way up the roof produce handsome specimens.

In a third scheme bush trees occupy the sides of the house, as in *V*, with pyramids

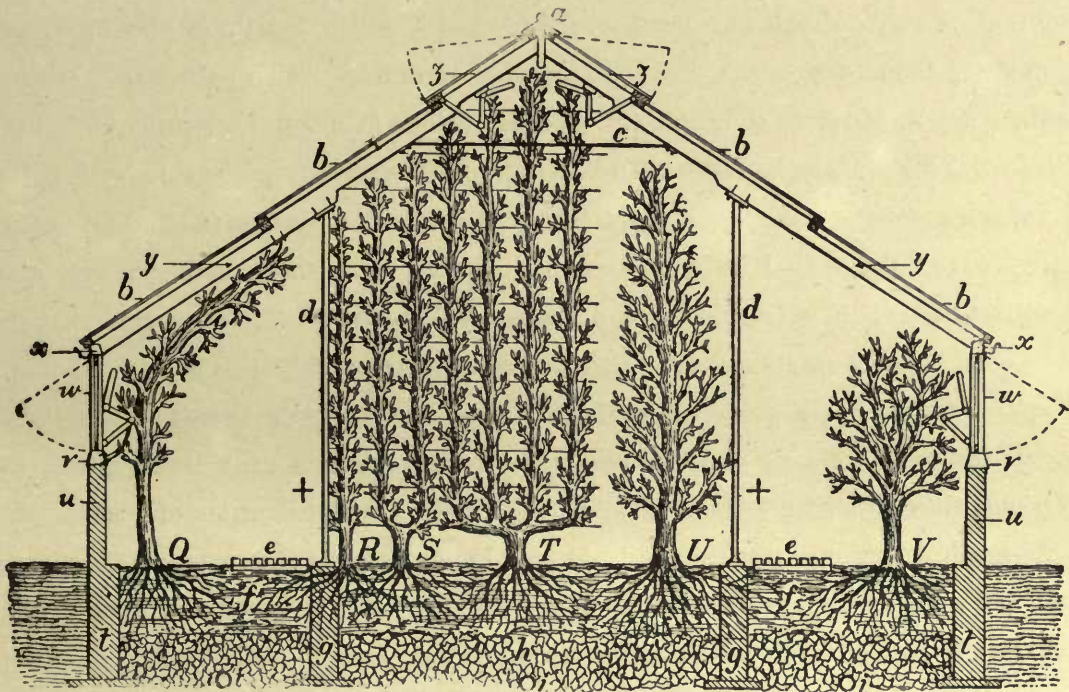


Fig. 17. SECTION OF SPAN-ROOF APPLE HOUSE, TREES PLANTED OUT. (Scale:  $\frac{1}{2}$  inch.)

*References*:—*t*, 9-inch brick wall; *u*,  $4\frac{1}{2}$ -inch brick walls, built in cement; *v*, sill,  $4\frac{1}{2}$  inches, bevelled; *w*, side lights, opening whole length of house; *x*, head,  $4\frac{1}{2}$  by 3 inches, bevelled; *y*, rafters, 7 by 3 inches; *z*, top lights, opening whole length of house; *a*, capping, projecting over joints of top lights; *b*, movable lights, 2 inches thick; *c*, 1-inch iron tie bar; *d*, pillars,  $1\frac{1}{2}$ -inch iron tube; *e*, batten paths; *f*, border, 2 feet deep; *g*, 9-inch brick pillars; *h*, rubble, 1 foot thick; *i*, 4-inch tile drains. *Q*, cordon apple tree trained to wire trellis, 1 foot from glass. *R*, single vertical cordon. *S*, double vertical cordon. *T*, four-branched vertical cordon. *U*, columnar pyramid. *V*, bush apple tree.

in the central part, two rows of trees 6 feet asunder, or three rows of columnar trees 6 feet apart in the lines, arranged in "opposite vacancy" order.

Yet a fourth arrangement merits attention, namely, half-standard trees in the centre of the house, planted 6 feet apart, thinning to 12 feet, with low-stemmed trees 6 feet from the sides of the house, the position of the lines of trees being indicated at the crosses (Fig. 17). The trees are trained with round open heads so that light penetrates



to the base of the branches, and, having advantage of every ray of sun, the crops are abundant and fine.

*Borders.*—Drains with proper fall and outlet are essential where the site is not naturally dry. A foot in depth of rubble over the drains, covered with 3 inches thickness of old mortar rubbish or chalk, prevents the border becoming stagnant. The soil may consist of turfy loam, rather strong, chopped up roughly, with one-tenth of quicklime incorporated with it. If deficient in calcareous matter, add a sixth of old mortar rubbish or one-tenth of chalk weathered by frost; if too light, add a fourth of clay marl, dried and pounded; if too stiff, add a fifth of sharp road-scrapings well weathered. Mix well when the compost is rather dry, and put together rather firmly in the border.

*Planting.*—Select trees coming into bearing. Lift carefully, preferably with balls of earth adhering to the roots, and plant firmly directly the leaves fall afford a good watering, cover the soil 1 to 2 inches in thickness with short, rather lumpy stable manure from the stem outwards beyond the spread of the roots, and secure the trees loosely to the trellises or stakes, deferring proper adjustment till spring.

*Winter Treatment.*—Remove the roof lights after the fruit is gathered and the foliage down. If the roof lights are removed while the trees have immature leafage, and sharp frosts occur, they suffer injury from the sudden chill and deprivation of leaves. Perform the needful pruning, cleanse the trees and house, remove the remains of mulchings without much disturbance of the surface roots, scraping off the loose soil, supplying an inch of fresh loam, and over that sprinkle 4 ounces per square yard of this mixture:—steamed bone-meal, 5 pounds; kainit, 2 pounds, mixed. If the trees need vigour, spread a light dressing of short manure on the soil, leaving it there to decay. The roof lights need not be replaced until the buds of the trees commence swelling in the spring; yet the lights should be put on the house before the leaves and blossoms appear.

*Summer Treatment.*—Leave an inch of ventilation by the top lights constantly, except when frost prevails. Open the top ventilators when a shaded thermometer indicates between  $40^{\circ}$  and  $45^{\circ}$ , the side lights at  $50^{\circ}$ . Close the house at  $50^{\circ}$ , and when the blossoms show colour and until the fruit is set, admit about an inch of ventilation by the side lights as well as by the top lights, having regard to the exclusion of frost. Up to the fruit setting too much air cannot be admitted, never allowing the temperature to exceed  $50^{\circ}$  without full ventilation in the first half of the day, and not closing so early as to raise the temperature over  $65^{\circ}$ . After the fruit commences swelling and the first leaves are of full size, close the house at 3 P.M. on days which, from cloud alternating with gleams of sun,



are not calculated to raise the temperature over  $80^{\circ}$ , but when the weather is hot and the sun powerful, close about 5 P.M. Damp the house well at closing time, syringing the trees on fine days, always sufficiently early to allow of the foliage and fruit becoming fairly dry before nightfall. Sprinkle available surfaces early in the day, avoiding morning syringing, unless necessary for freeing the trees of red spider; then operate early and admit air before the sun acts powerfully. Foliage long kept dripping wet turns brown, and water resting on the fruit any length of time causes the skins to be rough and often to crack. Air should be admitted early in the morning, not later than 7 A.M., and occasionally an hour sooner. It is a safe plan to admit some air all night by the top ventilators. This allows the pent-up moisture to escape and the atmosphere to gradually cool, thus inducing rest in the trees, but sharp currents of air are highly prejudicial; therefore, when strong wind prevails, admit air on the opposite side of the house. These matters, though apparently small, are important. Husbanding sun heat by early closing secures the finest possible fruits, whilst judicious ventilation insures the elaboration of their juices, and these conditions, combined with full exposure to light, impart high colour and superior quality. From June to September, inclusive, the house should have the ventilators opened between 6 and 7 A.M., and closed between 3 and 5 P.M., admitting air at night by opening the top lights a few inches about 6 P.M. After September, air must be freely admitted at night, husbanding the sun heat by day, if necessary, to mature late fruit and ripen the growths. Though water must be kept off fruit advanced towards maturity, the soil must be healthfully moist, or the apples become mealy. Apple trees are impatient of drought; therefore afford thorough soakings of water, always before they are distressed by lack of it. Dribblets are ineffective. Feed as required with liquid manure, affording dressings of superphosphate or other artificials occasionally, but be careful in using these, for apple trees abhor strong salts. Soot forms a good all-round food for apple trees, and nothing benefits them more than an occasional dusting of quicklime.

*Culture in Pots.*—Apple trees answer well in 9 and 10-inch pots. They may be raised from cuttings and layers, or established on Paradise stocks. On their own roots the trees become compact, and, with care in cropping, are serviceable. Trees, however, on Paradise stocks afford the best results; they may be grown in bush, pyramid, or low standard form. Young trees ought to be potted in autumn, and become thoroughly established in the pots before allowing them to bear fruit. The trees will produce fruit over a number of years, without change of pots, but the soil must be removed from the



surface, also partly round the sides of the pots, annually, and fresh added, making it firm; while rich surface-dressings may be given during growth, along with liquid manures as needed. Trees may be shifted into larger pots when the fruit is gathered, and before the leaves fall. Freshly-potted trees should be stood on a well-drained base impervious to worms, in a sunny, open, yet sheltered situation outdoors, and be plunged in coal ashes over the rims of the pots, during the winter.

During the first year the trees may remain outdoors, keeping them well supplied with water and nourishment till they arrive at a promising bearing state, when they may be placed under glass in the spring. As a rule and in most places it is advisable to keep them under glass until their growths are sufficiently matured in bud and wood for the succeeding year's fruit production, when they may be placed outdoors. In favourable localities many trees are placed outside sooner and there mature their crops.

The trees should be placed in the house in March, or before the buds are far advanced in swelling, and it should be remembered that they succeed only in light, airy structures, with plenty of room. Great attention must be paid to the watering when the fruit is swelling. If the supply is inadequate, firm-fleshed apples may be gritty, and the tender-fleshed mealy. After a tree has parted with its fruits, and the growths are firm, stand it outside in the quarters already alluded to, watering as needed, and protect the roots in winter by plunging the pots. Pruning consists in pinching irregular growths and thinning to prevent overcrowding of the leaves. Strict attention must be given to cleanliness, thinning the fruits, watering, and feeding, then the produce of apple trees in pots repays the trouble—not otherwise.

#### ENEMIES OF APPLES.

Canker (*Nectria ditissima*) is the most disastrous malady to which apple trees are liable, and has been fully treated in Vol. I., page 229. Mildew (*Oïdium farinosum*) attacks the young leaves and blossoms, and has had attention, Vol. I., page 245. Scab (*Cladosporium dendriticum*) infests the leaves, young growths and fruit. In destructive effects it is second only to canker. Its treatment is propounded, Vol. I., page 238.

*Speck* (*Oïdium* (*Monilia*) *fructigenum*) (Link).—This fungus affects the fruits of the apple, apricot, cherry, pear, and plum, also the fruit of rosaceous trees generally. It first appears on half-grown fruit in the form of small yellowish-white, round, convex tufts, composed of densely-packed erect filaments. These patches are generally grouped in the apple in concentric form, as represented in Fig. 18.



The mycelial threads penetrate the epidermis, and through that the filaments break, together forming the raised patches on the surface of the apple. The patches have a yellowish-white appearance, becoming brown or black through the destruction of the tissues, and the fungus appears to be checked in its growth by drought; hence it flourishes on fallen fruit, as such receives moisture from the earth. It, however, becomes most pronounced on ripening or ripe fruits. Though not so prevalent nor so injurious to the fruit as scab, yet specks on apples detract from their appearance and using qualities. One noticeable feature about this fungus is that, instead of causing the fruit to

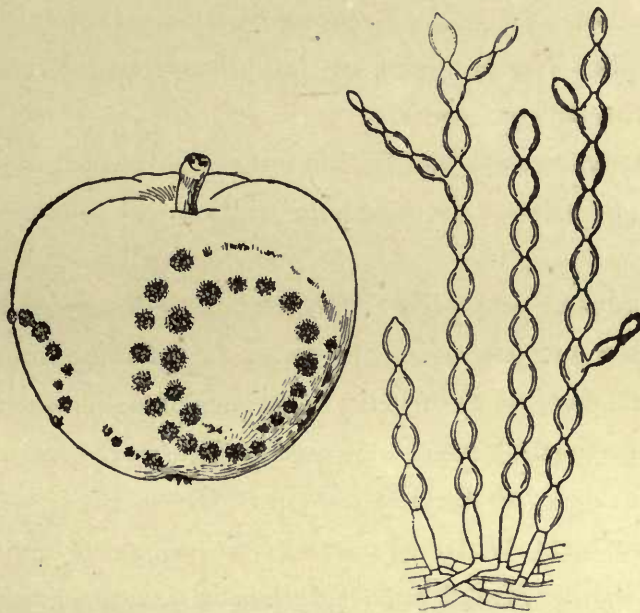


Fig. 18. SPECKS ON APPLE (*Oidium fructigenum*).

*References* :—Specks on half-grown apple, showing the size and form of the patches occasioned by the fungus, natural size. On the right is seen the mycelium at the foot, and springing from it the erect filaments, branching along the side and near the tips; greatly magnified.

decay, it actually makes apples keep longer, but at a great sacrifice of juiciness and quality.

Its attacks may be prevented by spraying with the ammoniacal carbonate of copper solution, as described for apple scab, Vol. I., page 241, when the fruit is half or not more than three-parts grown. Autumn and winter fruit may be sprayed as late as August, but it is desirable that fruit treated with the solution so late in the season be well washed by rain or artificially before use or storing. When these measures are taken, *Oidium fructigenum* does not appear on fruit in stores. The fungus is taken



into the fruit room, often on fallen fruit, in a more or less developed stage, and finding the essential moisture in the air of the room, the patches become abundant and conspicuous. All affected apples should be rigorously excluded from the store, and those in it attacked by the disease promptly removed and destroyed. The best means of eradicating fungi is to prevent the spread and germination of their spores.

*Lichens and Mosses.*—These enfeeble the trees, cause ill-health, unfruitfulness, and death of the branches. Their treatment will be found in Vol. I., page 250.

*Mistletoe* (*Viscum album*).—This plant is a true parasite, appropriating the sap of infested trees to its own use. Though prized for Christmas festivities, its growth injuriously affects the branches infested, preventing their thickening and impairing the value of crops of fruit. Where apples are the primary consideration, mistletoe should be cut off close to the stem or branch.

*Insects.*—The apple tree supplies food to numerous insects. Some have already been treated in Vol. I., therefore only need enumeration and reference. American Blight (*Schizoneura lanigera*), page 253, attacks the roots, stems, branches, and growths. Apple-bark Beetle (*Xyleborus dispar*), page 263, bores holes through the bark, forming tunnels in the stem, injuring and destroying the trees. Apple-blossom Weevil (*Anthonomus pomorum*), page 282, destroys the fructifying organs of the blossoms by its larvæ. Codlin Moth (*Carpocapsa pomonella*), page 266, greatly injures the fruit, its larvæ burrowing in the flesh of the apple, destroying its pips. Green Fly (*Aphis mali*), page 257, infests the unfolding buds, tender leaves and blossoms, subsisting on the juices of the young wood and foliage. Mussel Scale (*Mytilapsis pomorum*), page 272, fixes on the bark and extracts the juices of the tree, greatly to the prejudice of the crops. Red Spider (*Tetranychus telarius*), page 269, attacks the leaves and tender shoots, abstracting their sap, and injuring the current as well as prejudicing future crops.

Orchard pests, including Figure-of-Eight Moth (*Diloba cœruleocephala*), page 284; Lackey Moth (*Bombyx neustria*), page 285; Small Ermine Moth (*Hyponomeuta padella*), page 286; Vapourer Moth (*Orgyia antiqua*), page 286; Mottled Umber Moth (*Hybernica defoliaria*), page 287; Pale Brindled Beauty Moth (*Hybernica polosaria*)—syn.: March Moth (*Anisopteryx ascularia*), page 288; and Winter Moth (*Cheimatobia brumata*), page 289—all by their caterpillars feed on the foliage of the apple, doing immense mischief.

Ants, page 255; Earwigs, page 267; and Wasps, page 279, prey on the fruit.

*Apple Chermes* (*Psylla mali*).—Though a small and beautiful creature, the apple-



sucker, or chermes, is very destructive, sucking the sap from the leaves and young shoots, whilst their secretions fall on and clog the surfaces of the leaves and wood. The insects pair in September, and the females lay their eggs singly in rows, or several together, usually in the furrows of the knots and spurs, also on the previous year's growths. The eggs are white, pointed at both ends, a line and a half long, and the fourth of a line thick, and become yellow before hatching. The larvæ emerge from the eggs from early March to early April, according to season, and at once commence gnawing the scales of the nearest bud, and, gaining access to the blossoms, fasten on the stems of the flowers before they expand, depriving them of sap, and causing the flower-buds to shrivel. In a few days the larva throws out an immense number of very fine entangled threads or small hairs, which it turns up over its back, and with them entirely

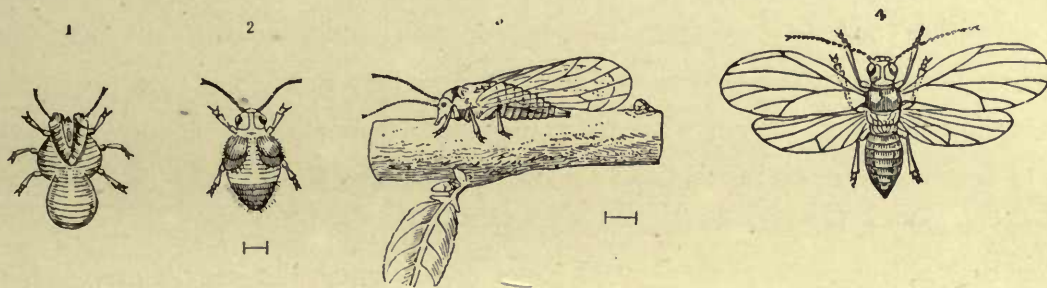


Fig. 19. APPLE CHERMES (*PSYLLA MALI*).

*References*:—1, larva, enlarged ; 2, pupa, magnified : natural size, line beneath ; 3, chermes on apple shoot, magnified : natural length of body below ; 4, insect on wing, much enlarged.

covers its body and head. Thus armoured, the chermes defies ants and other insect attacks, and after passing through various transformations of skin the insect retires to a part of the leaf which it selects, fixes itself there, and from the nymph, by splitting the back of the case, a beautiful winged chermes appears. The back of the thorax is of a light green, the abdomen is marked with yellow rings, and the membranous wings with strongly-marked snow-white veins. They may be found in small parties on a yellowing leaf in September. The perfect insects appear in June.

This pest is a very old and not very generally noticed enemy of apple buds and young growths, being confounded with aphides and American blight on account of its downy covering. From the aphides it may be known by its rather larger size, rounded wings, harder body, and jumping when disturbed ; and chermes are readily distinguished from woolly aphis, Vol. I., page 253, by their metallic lustre and wings. The illustration will assist growers to identify apple-suckers.



Thorough cleanliness and open growth and letting air and light have free access are inimical to chermes. Trees liable to their attacks and crowded in growth should be thinned directly the fruit is gathered, burning the trimmings, and when the leaves have fallen, the stems and larger branches of old trees should be scraped and thoroughly cleansed, as advised under "Lichen and Moss," Vol. I., page 250. Then spray the trees with the caustic soda and potash solution, Vol. I., page 251, and again early in March or before the buds swell with a solution of sulphate of copper, 1 pound to 35 gallons of water, for the destruction of the germs of fungi. The remedies advised under "Aphides," Vol. I., page 257, are also efficacious against chermes.

*Apple Weevil* (*Rhynchites bacchus*).—The purple weevil of the apple is  $\frac{1}{3}$ -inch long, purplish-red, coppery on the wing-cases and back of the neck; antennæ, beak and legs bluish-black. The female bores holes into the smooth side of the fruit during June and July, depositing one to four, generally two, eggs in each; and these hatch out small whitish grubs in a few days, which feed on the flesh three or four weeks, and then penetrate the core, causing the fruit to fall, when the grubs quit the apple and burrow in the soil, there to become pupæ, and from these the weevils emerge in May. This insect is not restricted to apples, but attacks pears and other fruits.

The best preventive is to remove all cover under which the weevils may hide, and place a sticky band round the stem of each tree in May, continuing it until mid-July. Gas liquor diluted with three times its bulk of water may be used in orchards in grass in late spring.

The most effective remedy, however, is to spread cloths beneath the trees, shaking the latter sharply early in the morning during June and July, sweeping the fallen weevils together, and then killing them with boiling water, or they may be shaken into rough wood trays gas-tarred inside. All perforated fruits should be collected and destroyed. Other species of *Rhynchites* also feed on the apple tree. *R. Alliariæ* is  $\frac{1}{6}$ -inch long, deep blue, with a greenish lustre. The female weevil deposits, in May or June, one or two eggs in the footstalk and midrib of a leaf or young shoot, and in about a week a small whitish grub emerges, which feeds inside the stalk and midrib of the leaf, causing it to wither and fall. The larvæ live in the stalks and midribs of the leaves of many other fruit trees, cutting them off when they are ready to enter the soil, there to become pupæ. *R. conicus* is  $\frac{1}{5}$ -inch long, deep shining blue, with a yellowish hue. The female pierces the young shoots in May and June, and lays eggs in them, gnawing each shoot partly through below the eggs, which causes it to droop, and the grubs gain



access to the pith, in which the larvæ feed. This pest infests other fruit trees. Removal of the injured leaves and shoots must be promptly attended to, burning them; and the weevils should be captured as advised for those of *R. bacchus*, but during May and June.

*Apple Sawfly* (*Tenthredo testudinea*).—The name sawfly refers to the female possessing a minute double saw at the hinder end of the body, which is a modified ovipositor. By means of this the apple sawfly deposits its eggs in the setting apples, during May or early June, the eggs hatching out tiny white grubs, and these feed upon the flesh of the young fruit. The larvæ become full-fed at the end of June or early July, and the apples fall to the ground when about a quarter grown; the grub then eats its way out, enters and forms a cocoon in the soil, where it remains in the pupa state until the following spring. The fruits of many apple trees are cast in great quantities, from attacks of the apple sawfly larvæ, when about the size of a walnut or less. Such fruit should be collected and burnt. Pointing the surface of the soil in autumn aids the destruction of the pupæ by exposing the cocoons to the keen eyes of birds, and dressings of quicklime, also soakings of diluted gas liquor and liquid manure, are useful.

*Canker Worms*.—These are slim caterpillars of different colours, having a looping gait, and noted for defoliating apple and other fruit trees early in the season. The term is an American one, but is sometimes used in this country, and applies to “looper caterpillars.” The canker worm (*Anisopteryx pometaria*) of America belongs to the same genera as our Pale Brindled Beauty or March Moth, and the Canadian and United States pomologists include all winter moth caterpillars in the general term canker worms, because they cause the trees infested to have a rusty, cankerous appearance. The preventive and remedial measures against them are the same, namely, banding the trunks of the trees with paper on which is spread a mixture of printers’ ink and molasses, to prevent the wingless moths from ascending the trees to deposit eggs on the twigs. The bands are put on in autumn and maintained through the winter, and for destroying caterpillars the trees are sprayed with Paris-green.

The caterpillars of the Brown-tail Moth (*Liparis chrysorrhœa*), Gipsy Moth (*Liparis dispar*), and Gold-tail Moth (*Liparis auriflua*) attack apple trees, the last-named moth being the most common. The eggs are laid on the branches and covered with hairs. The caterpillars form a slender web, and as soon as the fruit trees show flowers or leaves they commence feeding, retreating to the web at night and when rainy. When there is no food on the first branch, they shift their quarters, and in a short time form a new web on a fresh leafy branch. After their last moult the caterpillars disperse over the



tree, and in June or July spin a soft greyish cocoon between the leaves, in the forks of the branches and in crevices, and become chrysalids, from which the moths emerge in a few weeks. Treatment for their larvæ should be directed to the destruction of the nests in their early stages.

*Garden Chafer* (*Phyllopertha horticola*).—This beetle is  $\frac{2}{3}$  of an inch long, and  $\frac{1}{3}$  of an inch broad. Its wing-cases are reddish brown, shining, and shorter than the body; abdomen and head dark green or blue-black, with long, erect, paler hairs on some parts; antennæ reddish, with a shining, green club at their ends. The beetle feeds on the leaves of the apple and other fruit trees, gnawing them full of small holes, but it does most harm by devouring the stamens and petals of the blossom. The female enters the soil at the end of July and deposits her eggs a few inches below the surface, placing them in heaps containing eighty and ninety. They hatch in a fortnight, and the grubs feed on tender roots, becoming full-sized in two to three and a half years, and then are dirty white, with brown heads and blackish tails. The larva then takes the pupa form, passes the winter, and the perfect garden chafer emerges in spring, when the starlings are ready to receive it. Starlings are the very best destroyers of the beetles. There may also be captured by spreading cloths under the trees and shaking the latter sharply at night, when the beetles fall, feign death, and can be destroyed. Rooks and (near the coast) sea gulls use their strong beaks effectively in unearthing the grubs; tame ones may be utilised in gardens. Ammoniacal liquor from the gasworks, diluted with not less than three times its bulk of water, may be employed in grass orchards, distributing in autumn with a liquid-manure cart. Turning over ground that has been mulched exposes the grubs, as they come near the surface to feed on the roots encouraged by the rich soil, and should be picked out. Gas-lime kills the grubs, but it must not be used over the roots of fruit trees. A dressing of soot, 40 bushels, in March, and 2 cwt. of nitrate of soda per acre, a month later, have a good effect on larvæ and trees, especially poverty-stricken orchards on grass. Bare ground may be sown with rape, and when there is a good crop turn it under by spade or plough. This is useful on ground infested with larvæ, and in course of preparation for planting with fruit trees, especially bush fruits and strawberries.

*Apple-tree Blister Moth* (*Tinea corticella*).—This minute moth appears in May and June, and deposits its eggs on the stubby shoots and spurs. The larvæ emerge from the eggs in a few days, penetrate beneath the bark and cause brownish blisters. They live on the substance between the bark and wood, and in September the grub lets itself down



to the ground, spins a cocoon on a fallen leaf, and becomes a chrysalis, from which the moth emerges early in summer. The larvæ cause the spurs and growths infested to have a sickly appearance, and they usually collapse in winter.

All dead leaves should be removed in autumn, and burned, pointing the ground over, and giving a surface dressing of short manure. Washing the trees with soapsuds when the fruit is set, hinders egg-laying, and that is the best method to adopt.

*Goat Moth* (*Cossus ligniperda*).—Willow and poplar trees are the favourite food of the caterpillar of this moth, but apple and other fruit trees suffer from its attacks, particularly young trees growing in alluvial soils in low situations, probably due to the trees having soft wood and large pith. The caterpillar is the largest produced by any moth in this country, measuring when full-grown 4 inches long and having the thickness of the little finger. Its odour is so powerful and fœtid that its presence in a stem is easily detected. The body of the caterpillar is smooth, except a few scattered hairs; back and spiracles (breathing apertures) dark red, and head black. It has strong jaws, and can cut through the hardest wood. The moth's forewings are ashy-brown, and measure 3 inches across, hind wings brown and reticulated, and when the wings are folded the moth is difficult to espy on a branch in the day-time. The female secures her eggs well in the bark by means of her powerful ovipositor, or in crevices of rough bark down to living substance, so that the larva has nothing to do when hatched but eat away to the heart of the tree. Prevention is best effected by capturing the moths. Where willows, poplars, and elms abound, and they are infested with goat moth larvæ, the stems of fruit trees should be coated, early in June, with a mixture of clay, cow-dung, and tobacco juice, forming into a cream, and applying with a brush, to prevent egg-laying. If the trees are sprayed at the same time with the petroleum emulsion the moth's loathing of such nesting-places is complete.

To destroy the caterpillar, a wire may be thrust into the hole in the stem; if this is done when the castings are first made, it may be reached. Sulphur fumes kill them in their furrows. The nozzle of a fumigator should be held over the hole, and a damp cloth placed around it and held tight by one person, whilst another drives in the deadly fumes. Similar measures may be resorted to for destroying the caterpillars of the Leopard Moth (*Zeuzera Æsculi*).

*Apple-borer* (*Saperda bivittata*).—The beetle is about  $\frac{1}{2}$  an inch long, dusky-black, with grey stripes. The female deposits its eggs in June or July, in the collar of young apple trees, and the resulting grub eats its way through the bark, and lives on the albur-



nous wood, passing round the tree, and destroying it by its perforations. So far as we have observed, the attacks of this beetle are confined to trees in wet soils. The best preventive is to smear the stems of the trees at the collar in June with Davidson's Composition, Wilson's Sticky Oil, or the mixture advised for borers generally, Vol. I., page 262. The grub may be destroyed by pushing a wire into the burrow, and a solution of soft soap and petroleum ejected into its tunnels destroys the pest.

*Wæberian Moth* (*Tortrix Wæberiana*).—This moth appears in May and September; it is brown, with golden and silvery markings. Eggs are deposited on the stem and branches, and the tiny caterpillars, greenish-yellow with red heads, by degrees work their way to the inner bark, where they feed till mature, causing swellings which may kill the tree. These swellings are sometimes so considerable as to resemble canker, and have been an alleged cause of that disease in old trees. Associated with the wounds is a species of mite, *Acarus pyri*, attracted by the retreat and soft tissues. The mites readily succumb to washing out the wounds with a solution of soft soap, 2 ounces to a gallon of water. Spraying the trees in May and September with soapsuds and petroleum prevents the *Wæberian* moth laying its eggs.

Some of the short-beaked weevils occasionally prove destructive to the young growths of apple trees, especially grafts, cutting a number off in a single night. The most hurtful are the Red-legged Garden Weevil (*Otiorhynchus tenebricosus*) and Clay-coloured weevil (*O. picipes*), both general feeders, and they will be treated under other fruits. The Red-bud Caterpillar attacks the blossom and leaf buds. The Red-belted Clearwing Moth (*Sesia myopœforme*) larvæ live in the pith or wood, mining in the shoots of the current year. Bark beetles (*Scolytus* species) attack apple trees, yet rarely when quite healthy, and affected trees may be managed as advised for *Bostrichus dispar*, Vol. I., page 262.

It will be seen the apple grower has many enemies to combat, but by close observation and prompt action he may to a large extent either prevent or subdue them. Absolute prevention may not be possible, but it is possible and practicable to prevent the enemy gathering in countless thousands, and so become a devastating plague. In contests with insects it is necessary to be on the alert and strike quickly, and those who do so will be the victors.



## APRICOTS.

THE Apricot (*Armeniaca vulgaris*) was introduced into Europe from Asia more than three centuries before Christ, and into England in the first half of the sixteenth century, during the reign of Henry VIII. "John Tradescante," records Parkinson, "brought the Algier and many other sorts with him returning from the Algier voyage, whither he went voluntary with the Fleete that went against the Pyrates in the yeare 1620." Its specific name is due to the belief that it is a native of Armenia; but M. Regnier asserts that it has not been found wild either in that district or in any of the neighbouring provinces, and expresses his belief that it is a native of Africa. It is said by travellers to flourish in the African oases in such abundance that the fruit is dried and carried to Egypt as an article of commerce. Dr. Hogg states, in his *Vegetable Kingdom*, that, "In the East, the fruit is dried in the same way as figs are, and used as an article of food." Also that, "It has been cultivated in this country since the time of Henry VIII., whose gardener, named Wolfe, a Roman Catholic priest, introduced it from Italy."

The apricot is a low tree, somewhat crooked and ungainly in its growth, deciduous, and not hardy in the northern parts of the kingdom. The hardiest varieties, however, succeed fairly well as standards in the southern counties, but in most localities the trees require the protection of a wall or of a glass structure. The leaves are convolute when young, ovate or subcordate when full-grown, smooth, and glandularly serrated. Flowers sessile, pinkish white, appearing before the leaves, usually in February or March. Fruit round or ovate, fleshy, rich, and delicately flavoured, being less acid than most stone fruits. Apricots are used for tarts both green and ripe; also preserved with sugar in both these states; candied, when ripe; and sometimes dried as a sweetmeat. The best examples of the choicest kinds are esteemed at dessert, alike for their beauty, richness, and delicacy of flavour. Large quantities of fruit are imported annually from France and more southerly climes, but these do not equal the best home-grown produce, either in appearance or flavour. The kernels of apricots have a pleasantly-bitter flavour, and are said to answer as well as almonds for several purposes in confectionery. They contain a sweet oil, and the gum that issues from the tree is similar to that of the cherry, peach, and plum.



## SELECT VARIETIES.

The two varieties first named ripen their fruit on standard trees in warm positions in the south of England, but usually better against walls, which all the others require and deserve.

**ALBERGE.**—Fruit small, flattened; skin deep yellow, with reddish spots; flesh deep orange, firm, not very juicy, but vinous, with a somewhat brisk acidity; kernel bitter. End of August. The tree is a strong grower, hardy, and an abundant bearer.

**BREDA.**—Fruit small, roundish; skin deep orange, dotted with brown and red; flesh deep orange, juicy, and well flavoured; kernel sweet. Middle of August on walls, September on standards.

**EARLY MOORPARK.**—Fruit medium, roundish, inclined to oval; skin yellow, mottled and dotted with crimson; flesh orange, very juicy, rich, and vinous; kernel bitter. Middle of August.

**HEMSKERK.**—Fruit large, round; skin yellow, reddish next the sun; flesh orange, juicy, and richly flavoured; kernel bitter. Middle of August. This is a variety of Moorpark, very nearly allied, and a little, but very little, hardier.

**KAISHA.**—Fruit medium, roundish; skin pale yellow, reddish next the sun, tinged and mottled; flesh transparent, yellow, juicy, and rich; kernel sweet. The tree is an excellent bearer, not a strong grower, but healthy.

**LARGE EARLY.**—Fruit above medium size, rather oblong; skin pale orange, brighter on the sun side, spotted red; flesh orange, juicy, and rich; kernel bitter. Beginning of August. The tree is not liable to gum.

**LARGE RED.**—Fruit large, oval; skin, deep orange; flesh reddish yellow, juicy, and rich; kernel bitter. End of August and beginning of September.

**MOORPARK.**—Fruit large, roundish; skin orange yellow, with brownish red on the sun side; flesh reddish orange, very juicy, rich, and vinous; kernel bitter. One of the best, but very liable to gum. End of August and beginning of September.

**NEW LARGE EARLY (Rivers).**—Fruit rather large or above medium size, oval; skin pale yellow or whitish yellow, flushed red, with a few crimson spots; flesh yellowish, juicy, very rich; kernel bitter. Early in August.

**OULLINS EARLY PEACH.**—Fruit large, oval; skin pale yellow, tinged with red on the sun side; flesh yellow, delicate, juicy, rich and delicious; kernel bitter. Early in August. The tree is very healthy and a great bearer.

**PEACH.**—Fruit large, oval; skin pale yellow, tinged with red; flesh reddish yellow, tender, juicy, rich and slightly perfumed or musky; kernel bitter. End of August and beginning of September. It is one of the finest, and though similar to Moorpark in fruit, is dissimilar in its foliage and habit.

**POWELL'S LATE.**—Fruit large, roundish; skin yellow, deepening to orange on the sun side; flesh reddish orange, juicy, rich and vinous; kernel bitter. Middle of September.

**ROYAL.**—Fruit large, oval; skin yellow tinged with red; flesh pale orange, firm, juicy, and richly flavoured; kernel bitter. Beginning to middle of August. Healthy and hardy.

**ST. AMBROISE.**—Fruit large, compressed at the sides, pointed; skin deep yellow, reddish next the sun; flesh orange, juicy, rich, and agreeably flavoured; kernel bitter. Middle to end of August; tree healthy and an abundant bearer.

**SHIPLEY'S or BLENHEIM.**—Fruit medium to large, oval; skin deep yellow, deeper on the sun side; flesh yellow, juicy, moderately rich; kernel bitter. Beginning to middle of August. Tree hardy, healthy, and a good bearer.

**MONTGAMET (Alberge de Montgamet).**—Fruit small, oval; skin pale yellow, tinged with red; flesh yellowish, firm, juicy, and agreeably acid; kernel bitter. Beginning of August.

**ROMAN.**—Fruit medium to large, oblong; skin pale yellow; flesh yellow, and agreeably acid; kernel bitter. Middle to end of August.

**TURKEY.**—Fruit medium, roundish; skin deep yellow, brownish orange on the sun side; flesh pale yellow, firm, juicy, sub-acid; kernel sweet. Middle to end of August.

The three last-named varieties are sub-acid, and therefore considered specially good for preserving. Alberge, Kaisha, Moorpark, and Shipley's are also suitable for the same purpose as well as for dessert.

**APRICOTS IN ORDER OF SUCCESSION.**—New Large Early, Early Moorpark, Oullins Early Peach, Kaisha, St. Ambroise, Moorpark, Peach, and Powell's Late. Three good varieties :—New Large Early, Oullin's Early Peach, and Powell's Late. One :—Moorpark. One for moderate space :—Kaisha. Varieties for covering large surfaces such as house walls, gables, and buildings in not very favourable localities :—Royal, Shipley's, Large Red, and Powell's Late. For cold localities :—Breda, Shipley's, and Royal.



## PROPAGATION.

The apricot is raised from seed, also increased by budding, and sometimes by grafting.

*Seed.*—Some varieties reproduce themselves, or with slight variation, from the stone. The Peach and Moorpark may be mentioned as possessing that characteristic, and Oullins Early Peach was raised from the former; Early Moorpark, Hemskerk, and Powell's Late are of Moorpark origin. Mr. Thomas Rivers raised the New Large Early from Large Early, and Shipley's was raised by Miss Shipley, the daughter of a former gardener to the Duke of Marlborough, at Blenheim. This has a decidedly hardier constitution than the Peach and Moorpark Apricots, though it is not equal to them in quality, and all the others named have better constitutions than their parents, with little if any depreciation in the quality of the fruit. It is, therefore, desirable to seek new varieties by cross fertilisation from acclimatised parents. Varieties are wanted with the hardiness of the Breda and Shipley's, and the size, colour, and quality of the Peach and Moorpark. In raising trees from seed, stones of the best varieties and most perfect fruit should be selected. They may either be kept till spring in flower-pots in alternate layers with damp sand, or sown as soon as the fruit is ripe, in light, moderately rich soil in a warm situation. Place the stones 6 inches asunder in drills 2 inches deep, and the rows 1 foot apart, covering with sandy soil, and in the autumn spread 2 or 3 inches thickness of dry litter or cocoanut fibre refuse on the surface as a protection against frost. In the following autumn the seedlings should be taken up, the tap root cut back to about 6 inches, then planted in rows 1 yard apart and 2 feet between the trees. A more desirable plan of testing seedlings is to treat them as single cordons trained to walls with suitable aspects, lifting the trees annually so as to induce early fruiting. They will also fruit in the third or fourth year after budding on plum stocks, grown as upright cordons in pots in orchard houses, or trained diagonally to walls. For trees to be grown in pots, or planted out under glass, seedling apricots answer admirably as stocks.

*Budding.*—Seedling stocks do not answer for apricots in any but warm soils, and plum stocks on which apricots are budded are advised to be raised from stones as more healthy than stocks increased by layers. The Brussels stock is the best for trees that are to cover large surfaces, also for those to be budded for standards to occupy the upper part of high walls. The Peach, Royal, and Blenheim succeed on that stock, but Moorpark and other varieties named do not. The Moorpark grows best on the Mussel



stock; all other sorts on the Black Damask or St. Julien. All apricots "take" on the Brompton stock, but it is liable to canker and is not lasting. Budding is usually done from the middle to the end of July, when the bark with the bud can be readily detached from the wood. For dwarf trees the buds should be inserted 6 inches from the ground, never more than 9 inches, as when budded at 1 foot, the trees have too long stems, occasioning a loss of wall surface. Standard or rider trees should be budded at the height required. The buds selected for insertion must be wood buds.

*Grafting*.—Success depends entirely on the selection of scions with wood buds, ripe wood, and keeping the buds dormant until the sap rises freely in the stocks. Scions should be detached in January, and inserted half their length in moist sand at the foot of a wall with a north aspect. Whip-grafting is the most eligible method. In preparing the scions the wood should be well thinned away, and, after insertion, binding, waxing, or claying, success will be better assured by wrapping the stem of the stock and covering the pigment with damp moss, or placing soil against the stem as high as the top of the clay. This will cause the sap to rise freely, and when the scion has united with the stem, the wrapping or earthing can be removed. Grafting is seldom practised, budding being a much safer and better method to pursue.

#### SITUATION AND ASPECT.

Except in specially warm soils and situations, apricots do not succeed as standards or bushes in the open. The blossom, though comparatively hardy, is liable to be destroyed by spring frosts, and the tender fruit is even more susceptible of injury from cold. In late springs the blossom and incipient fruits have a better chance, through the foliage being more advanced and protective, but the chief cause of failure is imperfectly developed buds and immature wood. Crops on standard trees can only be relied on in exceptional situations and seasons, those occurring favourably to the apricot "about twice in seven years" (Rivers).

The great bane to the apricot is damp. It seems to take every opportunity of showing its detestation of moisture-laden air. Sheltered nooks it may grow in, but it is there marked by a luxuriant crop of leaves and soft spray. On farmhouses and detached cottages trees may be seen covered with golden fruit, whilst those on the warm, sheltered walls of gardens are strong in growth and gum, but sparse in fruit. Indeed, the apricot loves air and light; the situation can hardly be too open, yet it must be exposed to the sun.



In the southern parts of England, walls with western aspects are often advised; but our experience teaches that eastern aspects with a southerly inclination are the most suitable. Western aspects are too moist. South-east aspects answer as far north as the Humber. South-west aspects are more moisture-laden than easterly, and thus contribute to earlier development of blossom, late growth, and immature wood. Easterly winds are proverbially cold and dry, and as they prevail most in spring, they retard the flowering and assist the blossom. The fruit also ripens more evenly because sheltered from the rain, which is most prevalent from the west in summer, and often beats forcibly against ripening apricots. Objections to the fruit ripening on one side on south aspects, whilst the other side is hard and unripe, will continue to be heard where the sun acts directly on the fruit whilst the other side is shaded. This can be obviated by a better disposal of foliage, or light shading material, when the crops are ripening, which to some extent also lessens the liability to dryness and mealiness in the fruit, but that is not due to aspect so much as to neglect in supplying the requisite nutriment to the roots of the trees. North of the Thames south aspects are the most desirable. North of the Humber south or south-east aspects are essential, and in some few places in the north, flued and heated walls with a southern aspect are found necessary to insure full and properly matured crops of this valuable fruit.

#### SOIL.

Where the wild plum flourishes there the apricot will do so. In soils that give luxuriance to rhododendrons the apricot would languish, whether it be peat or strong clay. It likes a friable loam, whether that is caused through silicious or calcareous matter. The finest trees we have seen were growing in silicious earth of good depth, over sand and gravel. Silicious and calcareous substances are essential to the successful cultivation of this and all stone fruits. There are few soils that do not contain lime, and still fewer that are devoid of sand; the point is to have them soluble and available for the building up of healthy fruitful trees. This is effected by judicious applications of manures, which, whilst directly furnishing nutriment, act on the inorganic elements, and liberate enough silicious and calcareous matter to give stability to the growth. Good friable loam suits the apricot. If it be light through an excess of sand, clay marl, dried and smashed, can be added to the extent of one-fourth to one-sixth; if strong, road-scrapings and old mortar rubbish will, in similar proportions, give it the required consistence. Soil deficient of calcareous matter should have lime



rubbish added to it if strong; if light, chalk is better, but clay marl is the most suitable for light soils.

The first requisite in apricot culture is drainage. No water must lodge within 3 feet of the surface. This is particularly necessary in deep loams, for in these the trees grow luxuriantly, and in dry seasons the roots penetrate deeply, through lack of moisture near the surface. Drainage must be efficient, but some soils are naturally drained. The soil should be stirred or trenched to a depth of 2 feet, and have the bottom broken up. If it has long been under cultivation, some fresh turfy loam mixed with it in trenching will be a desirable addition, employing strong fibrous loam for light soils, and light loam for heavy. Stratified soils are best broken up; the most fertile are those naturally or artificially blended.

*Forming Borders.*—Where the soil is a stiff clay, or its opposite extreme, namely, a brash of gravel, or sand, it is cheapest to make a proper border. The width need not exceed 4 feet in the first instance, and never need be wider than two-thirds the height of the wall the trees are to cover. It should be excavated to a depth of 3 feet, the bottom to fall to drains a foot lower, and 1 foot 6 inches from the wall. The drains should not be covered with soil, but with stones. Brickbats or other rough clean material not of a nature destructive to vegetation should be placed 6 inches thick at the bottom of the border for drainage, and on this 3 inches of finer, preferably old mortar rubbish, freed of pieces of wood. The border may then be filled 6 inches above its intended height with the top spit of a pasture where the soil is a good loam, sandy rather than heavy. Chalk, in pieces from the size of a hazelnut to a hen's egg, or clay marl to the extent of a sixth, may be added in silicious soils; for strong loam substitute old mortar rubbish or sandy marl. Avoid manure. All operations in connection with border making are best done in dry weather, and with the soil in good working order. The work should be done a month or six weeks in advance of planting.

#### PLANTING.

*Choice of Trees.*—See that the trees are budded, if maidens, at the right height, and for other description of trees the rule before given applies. Make sure that the junction of the scion with the stock is complete, that there is a clean healthy bark on the stock as well as the tree, the latter not strong and gross, yet sturdy, short jointed, and the wood firm. If there be any exudation or trace thereof, reject the tree, whether the gum be on stem or branch. Two or three years' trained trees are suitable; also older that have



been properly attended to in transplanting, so as to insure moving with good roots plenteously furnished with fibres. Those with two principal branches of equal strength, one on each side of the stem, are best. Trees that have strong central growths and weak side branches should be avoided. Selected trees cost more, but the difference between these and the inferior is trifling when compared with the advantages of the former. All trees should be carefully lifted, and all the roots practicable preserved. It is wise to see to this personally, or pay a little extra to have the work done well, also for having the trees properly packed, so that their roots will not be dried or their branches damaged in transit.

*Distances.*—Apricots do not succeed against low walls, unless the trees are subjected to lifting and root-pruning. Cordons are the best for low walls, restricting the roots to prepared borders of about a yard in width, and selecting varieties that are of moderate growth, and free in bearing. Kaisha may be taken as a model of a cordon apricot tree. Cordons should be planted 2 feet apart. For trees that are to be trained in the fan shape against a 9-foot wall, 25 feet apart is not too great a distance to plant; on a 10-foot wall, 23 feet may be allowed; on one of 11 feet, 21 feet; 12 feet, 19 feet; and 2 feet closer for every additional foot in the height of the wall. Against walls more than 10 feet in height, a trained standard or rider-tree should be planted midway between the dwarfs. Standard trees in the open should be planted 20 feet apart, or 24 feet where the soil is deep. These are seldom planted in England, but this work will find its way to the colonies, where what may be termed orchard apricots can be grown.

*Procedure.*—Apricot trees are best planted in the autumn, as soon as the wood is matured, and the leaves commence falling. This varies with the seasons and the conditions under which the young trees are grown. Those with their growths trained to walls mature better and earlier than trees trained to stakes in the open ground. Trees of home growth may safely be moved at the end of September or early in October, but it ought not to be attempted until the oldest leaves are ripe, and some falling. Those from nurseries will not be much later in coming to hand if orders are given early, with instructions to forward the trees as soon as they are safe for removal. This secures the best trees which have matured their growths early. A few lateral growths with immature wood and leaves are not of consequence at planting, but may act beneficially in inciting roots, yet it is absolutely essential that the leaves on the wood to which the trees are to be shortened be ripened, or the wood and buds will suffer from their premature loss.



In planting, an excavation should be made sufficiently wide to allow of the roots being spread out at full length. It is a good plan in newly trenched borders to firm the soil well where each tree is to be placed, as wide as the roots when spread out will extend. This is better than planting in loose soil, as the compressed soil at the bottom will induce fresh roots to extend nearer the surface of the border. No tree should be planted deeper than will admit of the roots where they start from the stem being covered with 2 to 3 inches of soil. If the trees have been planted deeper or shallower, correct the error.

Having cut back any long fibreless roots, and pared smoothly any bruised or broken ends, place a little mound of fine soil for the tree to rest on; disentangle the roots and spread them out evenly in layers with soil between, so that they will be regularly distributed through it, and not jammed together. The uppermost roots ought not to be covered deeper than 3 inches; all should have a slight inclination from the stem outwards, while the soil should be compressed about them. A little fine, rather rich, compost will assist in filling up the interstices in planting, and further the early and free formation of roots, but it must not be made rich with fresh manure. The best is the *débris* of the rubbish heap—vegetable mould—which has had the woody portions charred or burned, and quicklime added some weeks prior to its employment. It should be passed through an inch sieve to rid it of pieces of wood. Avoid leaf-soil that contains sticks or beech mast. The woody matter encourages fungus. Ordinary loam with a sixth part each of old mortar rubbish, sweetened horse-droppings, as used for mushroom beds, and wood ashes answer perfectly, incorporating well. These and the soil must be in a free working state, for it should be well consolidated. This is essential in the cultivation of all stone fruits, but trampling on it when wet is ruinous. Loose rich soil causes the roots to run riot, and the branches to become long and sappy, whereas it is firm, short-jointed wood that insures a maximum of health and large, juicy, full-flavoured fruit. A good watering may be given if the soil is somewhat dry, not otherwise. Mulch the surface with 2 to 3 inches thickness of stable litter, the coarser portions of straw having been removed. If rather lumpy all the better, but avoid manure in a close, soapy state. Secure the growths loosely to the wall to prevent damage from winds, not affixing them closely till the soil has settled.

Trees that have been properly attended to, and annually or biennially lifted, move with balls of soil. If they have not been so prepared, a trench may be taken out as deep as the roots, and one-third the distance from the stem that the trees cover of wall or



trellis, severing the roots and leaving the trench open ten days to a fortnight. This may be done the third or fourth week in August, or if the tree have fruit, as soon as it is gathered. If the leaves flag, afford a slight shade, but this is seldom necessary when care is taken to keep the soil inside the trench duly supplied with water, yet none should be given unless the foliage becomes limp. The trench may be filled after remaining open the time named. The detaching of the long roots causes others to push and permeate the undisturbed soil, whereby the tree can be safely moved at the end of September. This check to prolonged growth assists the wood to ripen, the buds to develop, and assures speedy and certain rooting. This is essential where the trees are expected to make a good start in the following year. It is also one of the best preventives of gumming, by inducing a thoroughly-matured condition of the wood, so essential in the main branches of a tree through which the sap is to flow; therefore, see that the trees have their wood well matured in their early years. It is the best way to insure longevity and fruitfulness with a modicum of disease. A slight shade may be necessary after planting, before the leaves fall, damping the foliage if it droop, in preference to soaking the soil. That, however, must be kept moist; a good watering a few days before moving, and again at planting, with the mulching above advised, being mostly all that is necessary to insure speedy re-establishment and complete success.

#### MANURES.

No fruit tree subsists better in hungry soils than the apricot, and none derives greater benefit from manures judiciously applied. Silica and lime are inseparable from its successful cultivation, for both enter largely into the constituent elements of the fruit, but phosphatic matter is absolutely essential also. Where there is a preponderance of lime and sand, the trees are dwarfed in growth, and the fruits contain more stone than flesh, but when the phosphatic, potassic, and sodic elements correspondingly prevail, there is an increase of substance in foliage, wood, and fruit. When they do not, there is an excess of foliage and wood, and an absence of fruit through blossom buds not forming, or if forming, not setting, or if setting, not stoning. This excessive use of stable and farm-yard manure in gardens has made many victims to gum and branches dying off suddenly, giving apricot trees a rueful appearance; whilst, on the other hand, neglect of stimulating manures has banished from cottages apricot trees, which, when healthy, often yielded sufficient fruit for paying the rent.

Steamed bone meal or ground coprolites are excellent for apricots. Half a peck to



the rod ( $30\frac{1}{4}$  square yards) is a proper quantity to use, preferably in February or March, and being durable, need only be applied every second or third year, stable or farm-yard manure being used as surface dressings. Where bone meal, which is slow but sure in action, is not supplemented by surface dressings of manure or stimulating liquid, recourse must be had to manures that act directly or soon after their application. Superphosphate of lime,  $3\frac{1}{2}$  pounds, and muriate of potash,  $1\frac{1}{2}$  pound, mixed, per rod, form a suitable manure for the apricot. If the tree to which the manure is to be given produces small leaves and weak wood, add 1 pound of nitrate of soda. This, however, will only be necessary in the case of silicious soils deficient in humus. A first dressing of the manure should be given early in March, and the second early in May. Half quantity only should be applied each time, distributing the mixture evenly on the surface as far as the roots extend, in no case digging it in. Trees that grow with sufficient freedom may have an increased quantity of superphosphate, omitting the potash, especially where they are disposed to make much wood. Four ounces is a suitable quantity of superphosphate to apply to a square yard.

The borders in which apricot trees are planted should have the surface neatly forked over in autumn, not going so deep as to injure the roots, or even to disturb them, and the whole border covered with short stable or farmyard manure an inch or two thick. In March the top dressing may be neatly pointed in, merely mixing it with the surface soil. This will allow air and rain to enter freely, also the sun's warmth.

*Feeding.*—In addition to the top dressings, two or three heavy waterings, supplied during dry periods in May, June, July, or the early part of August, will contribute to the health of the trees and the size of the fruit. The drainings of stables and cow-byres, also house sewage, properly diluted with water, are excellent aids in the production of apricots; and in the case of trees against cottages and farm buildings, house slops mixed with soapsuds, given after rain or when the soil is moist, are of great benefit. These give off no offensive smell, or need not if a little dry soil is sprinkled on the surface after the liquid has soaked in. To assist the application in hard ground, or even walks or pavements, holes may be made with a crowbar, not going so near the stem as to injure the main roots, repeatedly filling these with the liquid until the soil is thoroughly moistened, then pressing in rich soil firmly. This will not only do immediate good, but aid the passage of subsequent applications. These supplies may be continued till the fruit gives indications of ripening, after which clean water only should be used,



and one good soaking then will be sufficient to perfect the crop. After the fruit is gathered, water or liquid manure may be given if the weather continue dry, to help the trees to perfect the wood and buds, too dry soil causing many failures or thin crops of fruit on trees against buildings.

When trees blossom with great freedom, but rarely set more than a thin crop of fruit, the cause may often be traced to dryness at the roots, which have descended in quest of moisture into the subsoil. When this becomes really dry it is seldom moistened throughout by rain or surface-waterings, especially in soils that have not been properly trenched and rendered more moisture-holding by an admixture of suitable materials. It is well in such cases to break up the surface in autumn, without much disturbance of the roots, and throw the soil up in ridges running parallel with the wall, preventing damage from frost to the roots by a light covering of litter. The subsoil may during the winter become moistened, but if, upon examination in March, it is still found dry, the hollows between the ridges should be thoroughly soaked with water, renewing as it is absorbed until the subsoil has been moistened. When the water has fairly settled from the surface level the ridges and enrich the soil, then, by keeping it duly moist afterwards the roots will be attracted upwards, and more healthy growth will follow. Where the surface may not be broken up much can be effected by making holes with a crowbar, as advised for trees against cottages, and leaving them open during the winter, charging them occasionally with liquid manure, and before closing making sure that the soil is thoroughly moistened to a depth of 2 feet or more, rain being supplemented by water as is necessary.

*Mulching.*—For insuring a moist surface and encouraging the roots to spread and keep active, a covering of short, but not spent manure, is highly commended. Heavy mulchings are not advisable, but a thin covering of the surface with short, sweet, rather lumpy manure, saves labour in watering, and, whilst not depriving the soil of air and rain, preserves a genial condition uniformly, highly favouring the swelling and perfecting of the fruit. A couple of inches in thickness of stable manure, freed of the coarser strawy portions, applied at the end of May or early in June to the whole surface of the border, will prevent it “baking,” and great benefit will be derived from the application. It should be added to from time to time, as is necessary, and as it does not answer to allow the soil to crack after the fruit is gathered, the mulching should be allowed to remain and become wasted, as it will by autumn, by washing into and amalgamating with the soil.



## TRAINING.

Owing to the liability of apricot branches to die off, fan-training is the most generally adopted, and it is a system which enables the cultivator to fill wall vacancies that occur by a redistribution of the branches; also it enables old parts to be removed and new summer growths retained. Apricots produce fruit both on spurs and on firm annual wood, but the finest fruit is usually borne on well-ripened shoots of the previous year, similar to the nectarine and peach. Therefore it is essential to lay in young growths thinly, as well as to reserve a goodly amount of older wood in view of obtaining a plentiful crop of fruit from spurs should blossom buds not form freely on the new wood. This last, in some seasons, and under all cases of luxuriant growth, does not mature sufficiently early for perfecting blossom, whilst the flowers are more liable to injury from cold on gross young wood than those produced on spurs through the greater succulence of the former. Bearing in mind those characteristics, it will be apparent that no form of training is better than establishing a certain number of primary branches, and from these encouraging a series of subordinate parts, chiefly composed of bearing wood. The leading branches should not be numerous, but well defined, equal in strength and regularly disposed. Side branches should proceed from the primaries at an acute angle, in order that the sap may pass freely into them in its upward course, and be equally distributed, for it is not desirable that these side growths should rival the leading branches in vigour, unless it be found necessary to displace a worn-out or diseased branch by a younger and healthier one.

Trees against farm houses, cottages, and other buildings having doorways and windows, are usually trained on the fan system, modified to suit circumstances. The branches are not infrequently taken upright, while some are trained horizontally, strong growths in the latter being always chosen, and the subsidiary branches always taken from them at an acute angle. By these means surfaces are covered very efficiently with bearing wood. Indeed, as previously indicated, the trees on farm houses and cottages are often more productive than trees in gardens, where the soil is richer, and a formal method of training pursued.

Of late years single-cordon apricot trees have been recommended, both for covering wall space quickly, and preventing great loss ensuing should several branches or a tree collapse through gumming or the borer, a worm-like creature that penetrates the wood. If by trees trained as cordons, diagonally, or even upright, with the side branches radiating at an acute angle, a given wall space can be occupied with fruit-



bearing wood in a fourth of the time needed by fan training, the grower not adopting the former system must be purblind to its advantages ; but there is this to be said and remembered—the trees must be lifted and root-pruned as their condition requires. This entails labour, culture, but of a kind that pays, in enabling the tree to ripen its wood, bear uninjured the vicissitudes of our climate, better resist gum, and produce the best of fruit.

*Modified Fan.*—A maiden apricot tree, *A* (Fig. 20), consists of one upright shoot with a number of subsidiary growths or laterals. Let such have its roots severed with a spade 12 inches from the stem, at the end of September, to arrest late growth and assist in ripening the wood. When its leaves begin falling lift it carefully and plant in the position it is to occupy against a wall, cutting off the laterals close to the stem to the height of a foot, and when the leaves fall cut the tree down to within



Fig 20. FORMING FAN-SHAPED TREES.

*References* :—*A*, first ; *B*, second ; *C*, third pruning for producing branches.

9 or 10 inches of the ground, as shown by the bar. The following spring encourage two shoots (*B*), equal in strength, and as nearly on the same level as possible, training them as represented.

Laterals will push more or less ; pinch them at the first leaf and to one of subsequent growth, but if one shoot be weaker than the other, allow it to make three to five leaves, keeping the strong shoot closely pinched, and seek, by apportioning the foliage, to obtain an equality of vigour in both. Towards the end of September detach the roots 15 inches from the stem, and when the leaves commence falling, lift and replant, shortening each shoot to 6 inches, as indicated by the bars, directly the leaves fall. In the spring encourage two shoots from each branch, rubbing off others disposed to grow too strongly, and pinch those not likely to interfere with the main growths to three leaves. Through lifting each autumn the shoots will not generally push



laterals, but form short-jointed firm wood, thorough exposure insuring its complete maturation. When the leaves fall shorten the lower branches on each side of the stem to 15 inches, and the upper two to 9 inches each. This and the disposal of the branches are represented in *C*.

The following season take two of the best shoots from each of the four branches, training these eight leading growths equi-distantly, and lay-in young shoots between them. One on each side of the several branches will usually be sufficient each year, for there must be no overcrowding of the foliage, and any side growths that are not wanted pinch to three leaves. Short stubby shoots of an inch or less with the leaves disposed closely will be produced on the previous year's wood; these are natural spurs and must be preserved. With care in regulating the growths, so that the leaves of one



Fig. 21. TRAINING APRICOT TREES.

Reference :—*D*, result of three prunings.

branch do not overhang those of the others, removing gross and stopping out-growing shoots, the tree will be evenly balanced, the wood firm and well ripened to the points of the shoots, and fruit-buds bristling in the axils of the leaves by the end of August, under favourable conditions of soil and season. The tree, as it ought to be the first summer after shortening the four main branches, is represented in *D*, Fig. 21.

If a tree does not complete its growth by the third week in August, the points of the shoots being sappy, a trench should be made as deep as the roots, one-third the distance from the stem that the branches extend, leaving the trench open a fortnight, then fill it in firmly. The soil inside the trench must, if necessary, be watered, and shade afforded from bright sun to prevent severe flagging of the leaves. Directly the leaves fall, lift the tree carefully, and replant it firmly. In apricot culture it is



imperative that the tree have thoroughly matured wood each year of its growth from the maiden if it is to be healthy and fruitful. Under the conditions described the tree will be well furnished with branches and not require any pruning in the



Fig. 22. APRICOT TREE, FOURTH YEAR'S TRAINING.

autumn. In the fourth year from the maiden it should be in the condition shown in *E* (Fig. 22), bearing a good crop of fine fruit, the treatment having been the same as in the preceding year.

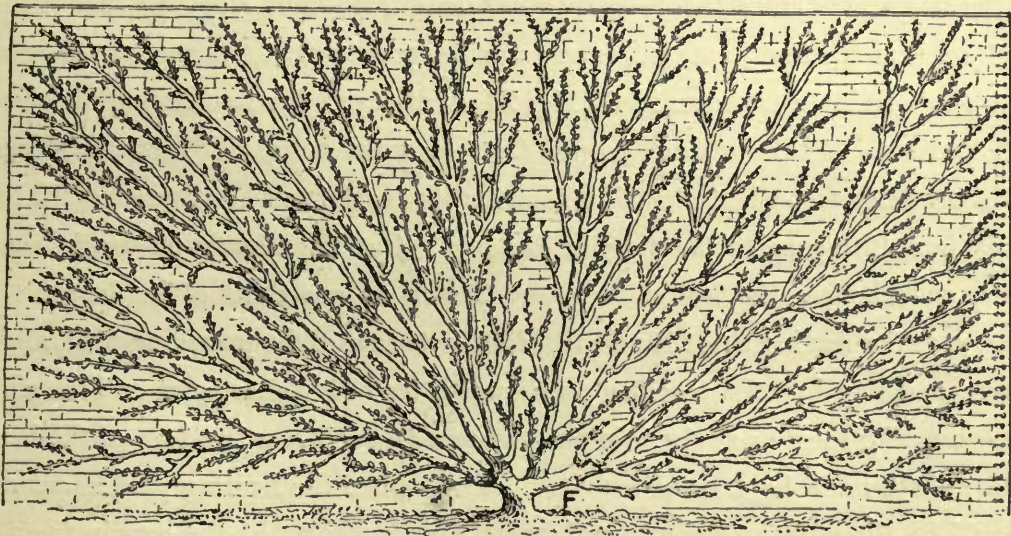


Fig. 23. ESTABLISHED FULL-SIZED TREE.

Fan-trained trees generally have three primary branches—a leader and two side growths—from which the subsidiary branches emanate. The objection to trees in this



form is the difficulty of securing equal vigour in the side branches as in the central one or leader, and eventually the lower part of the wall is liable to become unoccupied. The abandonment of that stereotyped method of preparing apricot trees is strongly advised in favour of the method shown and advocated, as more appropriate to the peculiar character of the trees, and therefore calculated to give the greater satisfaction. As the branches extend they naturally diverge, and as often as there is a distance of 15 inches between them another growth should be trained in, not otherwise. The principal branches will then be evenly disposed, with sufficient space for the leaves to develop, and the young wood to ripen. A full-sized tree, trained as advised, is represented in *F* (Fig. 23), with the main branches disposed as they should be, and young wood laid in between them, or as weak worn-out parts are cut out in the course of intelligent pruning. Standards on tall stems for walls require to be pruned and trained the same as advised for dwarf fan-trained trees.

*Cordon Training.*—The maiden tree intended to be trained in this form should have its roots severed in September, and be planted in the position it is to occupy as soon as the leaves fall. It should be planted aslant for training diagonally, cutting it down to 15 inches of the ground when the leaves fall. In spring select the most promising shoot to train as leader, rub off foreright shoots or those in front of the stem, lay in a well-situated shoot on each side, and pinch the rest at the second or third leaf to form spurs. Train the leader its full length without stopping, and pinch the laterals from it at the first joint, and to one of subsequent growth throughout the season. The first year's training is shown in *G* (Fig. 24, next page), the tree having been headed at the dotted bar. At the end of August the tree must be carefully examined, and if there is a tendency to push strong side growths its roots must be severed at 12 inches from the stem, lifting and replanting in October. Cut the laterals off nearly close to the stem, and shorten the leader to about 2 feet, or one-third of its length. The following year the leading shoot is selected, similar to that of the preceding year, and side shoots are encouraged on the previous year's wood, 9 to 11 inches apart on both sides of the stem, stopping them as advised for the younger tree. From the base of the bearing shoots a growth must be trained to bear in turn, when the fruiting part is cut away, as it should be directly the fruit is gathered. This is shown by the bars in the figure (*H*) as well as the second year's training, the full bar showing the current, and the dotted bars the previous year's, heading back. The third year's management of the cordon tree (*I*) is only an extended repetition of previous years' routine. The chief



points to be kept in view are the origination of side shoots whilst the tree is extending, and insuring a succession of bearing wood by training in a young shoot from the base of that bearing, so as to displace it without prejudicing the crop. Over luxuriance and late growth must be prevented by judicious lifting.

Upright cordons differ from diagonal in requiring the leading shoot of each tree

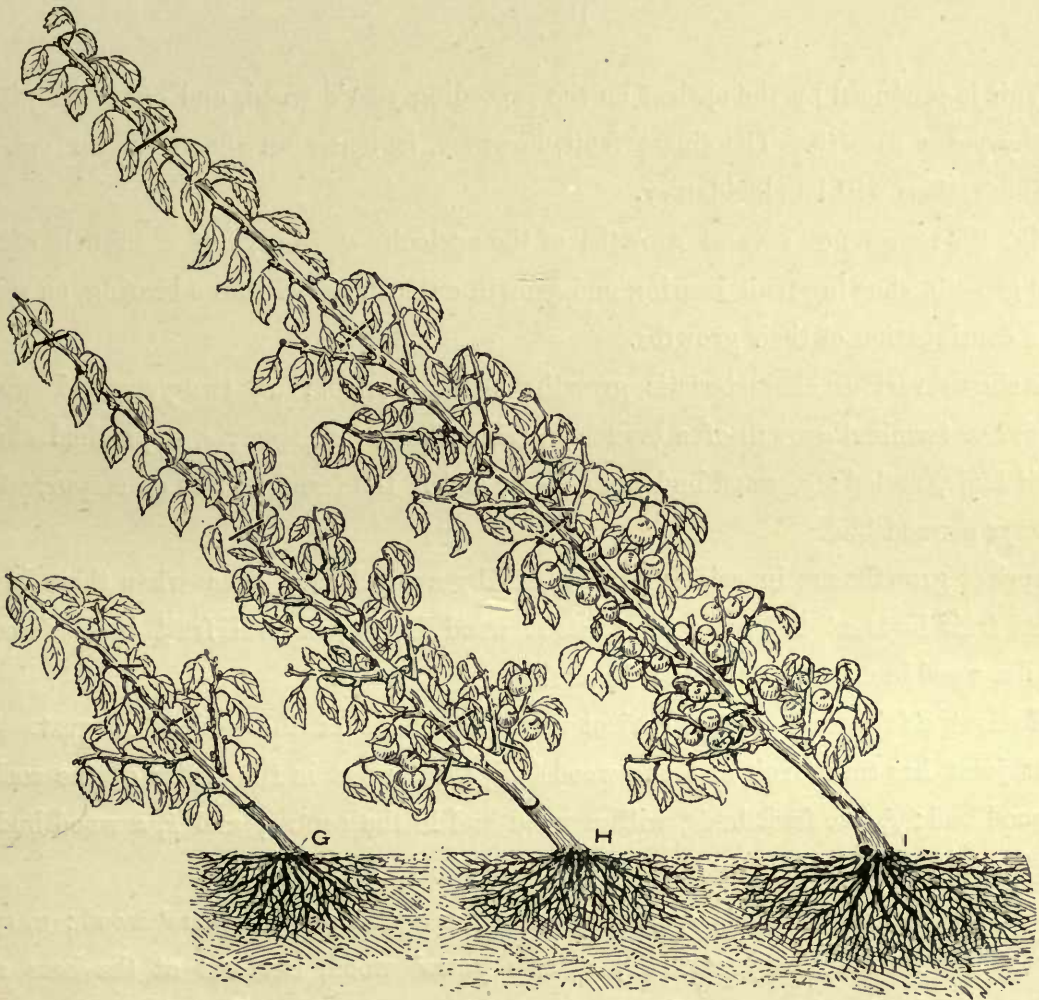


Fig. 24. FORMING CORDON TREES.

References :—*G*, first ; *H*, second ; *I*, third year's pruning and training.

pinched at 13 inches of growth to strengthen its base, selecting from the shoots produced the best as leader, pinching the rest, and all laterals at the first leaf and to one of subsequent growth. These laterals often form fruit buds, when they may be left full length or be cut back to one joint in autumn, the leader then being shortened to 15 inches as favourable pruning buds offer. When the leader, however, is left a considerable length,



there is danger of the buds at the base of the shoot not pushing with sufficient vigour to originate side shoots, but the growth of these may be assisted by depressing the upper part of the shoot to the horizontal line or lower, until the lower buds push strongly, when the branch should be trained upright.

### BEARING.

Fruit is produced by the apricot on the preceding year's wood, and on spurs of one or many years' growth. The finest fruit, however, is borne on shoots a year old. A few illustrations will be elucidatory.

Fig. 25 represents several growths of the apricot. *J* is part of a branch of last year's growth, showing fruit bearing and growth extension. *K* shows bearing on spurs, with a continuation of their growths.

*L* shows various characteristic growths of the apricot; *a*, two-years-old wood; *b*, leader or terminal growth of a branch; *c*, side shoots; *d*, spur; *e*, a pinched shoot; *f*, fruit buds, sealed; *g*, wood buds, unsealed; and *h*, the terminal bud of a spur, which is always a wood bud.

Apricot growths are invariably terminated by a wood bud, even when there is one or more fruit buds at the same joint, stout wood having several fruit buds disposed around a wood bud in the centre of the socket.

*M* shows a full-sized piece of apricot wood and buds at the end of August. The lowest joint has three fruit and one wood bud, the largest in the centre of the socket; *i*, a wood bud; *j*, two fruit buds, with a wood bud in the centre; and *k*, a wood bud on the left, and a blossom bud on the right, side of the leaf axil.

*N* shows part of a branch; *l*, side branches; *m*, spurs on two years' wood; *n*, spurs on wood more than two years old; *o*, two years' wood, cut out at the bars after bearing; *p*, shoots of one year's growth for the succeeding year's bearing; all the bearing wood is of one year's growth, except *q*, which is a two-year-old shoot, and the spurs, *m* and *n*. On the right-hand side of the main branch the branches and shoots are shown pruned and properly adjusted.

*O* shows part of a branch of a cordon apricot tree on the short pruning system; *r*, spurs; *s*, side shoots, closely pinched during growth. *P* indicates the condition of blossom requiring protection; and *Q* shows blossom fully expanded, when protection is imperative.



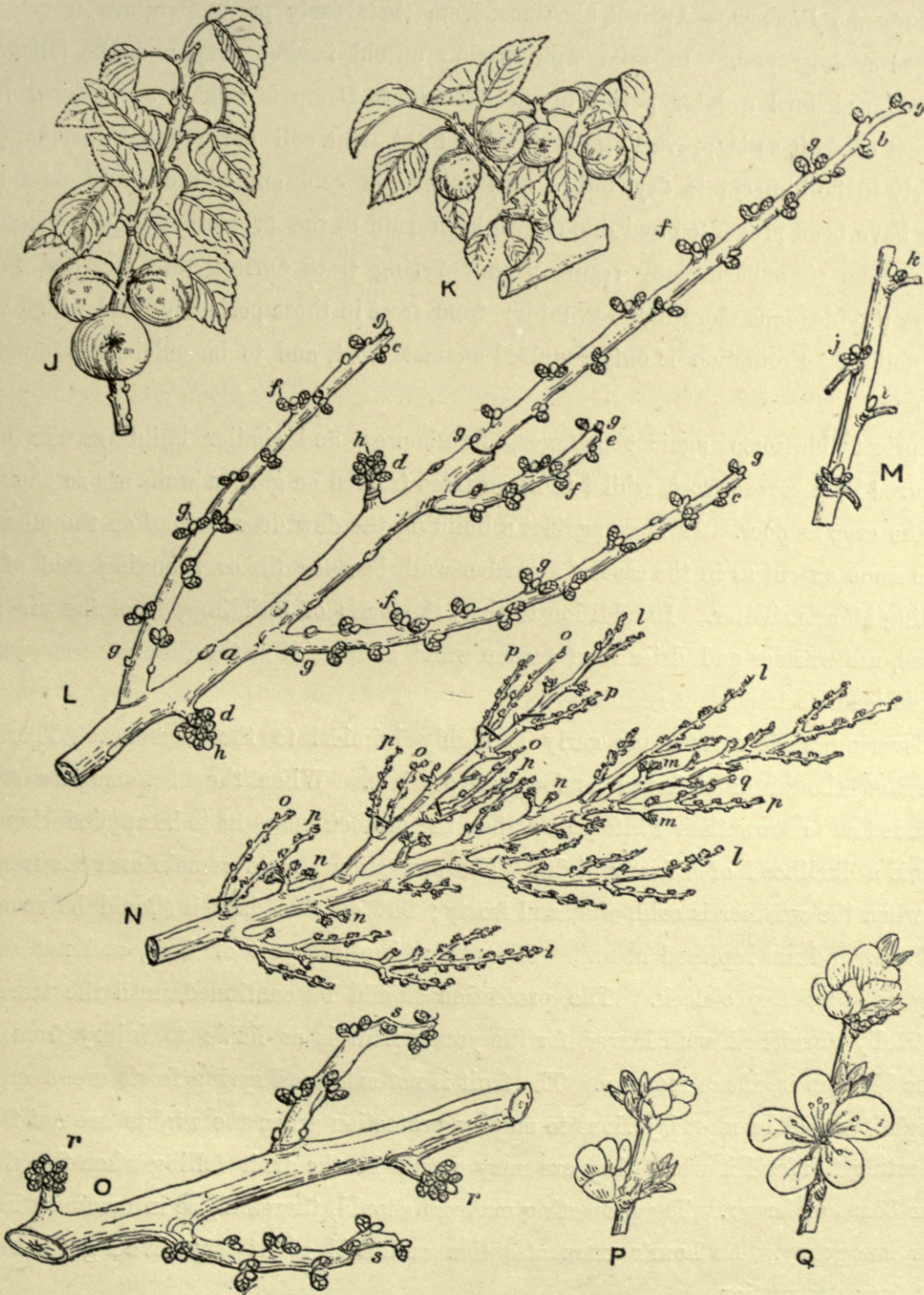


Fig. 25. VARIOUS GROWTHS OF APRICOTS. (For references, see text.)



## ROUTINE OPERATIONS.

*Protecting Blossom.*—Apricot blossoms, from their early production, are frequently damaged or destroyed. In mild winters they unfold in February, and the foliage is not produced until a later period to afford shelter. Damp is almost as inimical to a good set of fruit as is prevailing frost. A slight frost will not prove injurious, particularly if the blossom is dry, but a continuance of cold and wet does mischief that might have been prevented had due regard been paid to the protection of the blossom; at the same time harm may result from covering trees during mild weather, for it renders the blossoms more liable to injury from frost in those periods of cold which very often follow. Protection is only required against frost, and to be efficient it must be adequate.

Apricot blossoms against cottages, farmhouses, and similar buildings are often uninjured by a severe frost, whilst those on trees trained on garden walls are so damaged that the crop is poor. In trees against a building the dew does not fall on the blossoms to the same extent as in the case of a garden wall, because the overhanging roof of the building affords shelter. In addition to that, the walls of buildings, from the air they enclose, are warmer and drier than garden walls, and, small as the difference may seem, it often leads to important results.

Covering apricot trees too early is highly inimical to the blossoms. Therefore protection should be deferred as long as possible. When the blossoms are so far expanded as to show their white petals, then the protection ought to be applied whenever there is a likelihood of a frosty night. The protection should remain over the trees by day when the weather is cold, wet, and frosty; but on fine days it should be removed by 8 A.M., and not replaced at night unless there is a prospect of frost, and not sooner than half-past five o'clock. The protection should be continued until the trees are plentifully furnished with leaves, for the young fruit is as liable to injury from frost as the blossom is, if not more so. The fruit is not safe until spring frosts are over, and though it would be most injurious to employ protection when the nights are not frosty, neglecting to afford it when they are may result in the fruit falling when the size of horse-beans or larger. The protecting material should, therefore, be in readiness in case of an emergency. An hour's extra attention on a cold night may save a good crop of fruit from destruction.

*Disbudding.*—As the apricot produces its fruit upon spurs and on the wood of the preceding year, shoots ought to be trained in between all the principal and extending



subsidiary branches, but not too thickly, 12 to 15 inches being a good distance to leave them. A reservation of the best-situated growths for training in must be made in disbudding so as to insure a succession of bearing wood. The shoots retained should be laid in rather close to the branch from which they take their rise, each shoot being kept in its proper position by a twig of privet or hazel placed across it with the ends inserted under the adjoining branches. This is better than nailing in the young shoots, which, however, must be practised on extensions, but plenty of space must be allowed in the shreds for the swelling of the shoots. All shoots springing from the front of the branches should be rubbed off closely and early, so that no knife will be required. The best time to disbud is when the shoots are sufficiently large to be taken hold of by the finger and thumb. Beyond this disbudding of the fore-right and of gross ill-placed shoots everywhere, which result in useless breast-wood and cause crowding, no other disbudding is required for the apricot. If the work is deferred too long, or till they become woody, the bark is apt to be torn, and in that case they should be removed with a knife.

*Stopping the Shoots.*—After the disbudding there are always more shoots than are required for laying-in and for the extension of the tree; the points of these should be taken out at the third or fourth leaf, and subsequent growths stopped at the next leaf, repeatedly throughout the season. These will form spurs, or be plentifully sprinkled with fruit buds by autumn, and upon them fruit may be produced the following year. They should not be allowed to extend too much, but be kept close to the wall. Besides the shoots described there will be a number that do not grow longer than an inch or two, and produce a number of leaves. These are natural spurs, and ought not to be pinched or interfered with, except where they are very close together, when they may be thinned. All gross, unnecessary, and attenuated growth should be removed during the summer, and the earlier it is done the more benefit the parts left will receive from the diverted sap and the increased light. From the natural spurs no long shoots will arise, or very rarely, but neither from these, nor the young shoots that are stopped to induce spurs, should long growths be encouraged. They must be removed before they do mischief by shading the one- and two-year-old bearing wood and the spurs. Shoots of the current year trained in to replace those bearing fruit may, if the growth exceeds 12 inches, be shortened to prevent overcrowding, full exposure of the leaves on each branch to light and air, by curtailing those extending unduly, being essential to fruitfulness.

*Thinning the Fruit.*—This is an important operation, as upon it depends the size and



quality of the produce, and the present and after well-being of the tree. When young apricots set very thickly it is well to go over them as soon as the properly-fertilised fruits can be distinguished by their taking the lead in swelling, and relieve the tree of some of its superabundant crop. The smallest and ill-shaped should be first removed, and those which are likely from their position to become squeezed between the wall and the branches, or in some of the angles of the latter. Trees that are crowded with young fruit should be gone over three times, removing a quantity each time: first, when the fruit is the size of horse-beans; second, when as large as a hazel-nut; and third, when the size of a cob-nut or small walnut, leaving but few more at the last thinning than are necessary for the crop. Nothing is so detrimental to the health and sustained fertility of a tree as allowing a superabundance of fruit to remain until it is well advanced in stoning, then removing all at once a peck of fruit which, if thinning were done early, as advised, might be put in a quart measure or less. Weak trees ought not to be allowed to bring to perfection so many fruits as those that are vigorous, but strong branches may be allowed to carry more fruit than those which are weak, as the extra cropping of the vigorous branches will prevent their becoming too strong. One fruit of the large kinds to every half superficial foot of surface is sufficient to leave upon a vigorous tree to insure produce of the largest size and highest quality. Medium-sized varieties may have the fruit left 5 inches asunder, whilst the small sorts ought to have the fruit thinned to 4 inches apart to secure representative fruit for preserving. Each fruit must be allotted the square of the distance; large kinds having four, medium-sized varieties about seven, and the small sorts twelve fruits respectively to the square foot. Those are full crop quantities for vigorous trees; none should be overburdened, but have the fruit left proportionate to their strength.

*General Summer Treatment.*—In addition to matters already treated, there are others of detail largely influencing results. Securing the growths as they advance is essential to prevent breakage; give them the required inclination, and insure against their interference with the fruiting parts. Sufficient space should be left in the ligatures for the swelling of the shoots, and the trees ought to be examined at short, regular intervals for the needful regulation of the growths. A sharp look-out must be kept for enemies, assailing them upon their first appearance by the prompt application of an insecticide or fungicide as circumstances occasion. When a solution is used, leaving a deposit on the foliage, it should be thoroughly cleansed by a forcible syringing with clear, soft water. Beyond that, and an occasional washing to cleanse the foliage of dust, no syringing is



required by the apricot. It is, however, impatient of dryness at the roots. Rain often falls copiously without having much effect in the immediate vicinity of the wall against which the trees are growing. This must not be overlooked. From lack of moisture at the roots of the trees, the fruit not unfrequently drops, or is prejudiced in its swelling.

The fruit must be watched during its swelling, nails cleared out of the way, and injury by any cause prevented. It must not be overhung with spray, but kept well exposed to light. Shaded fruit is poor in colour and quality. When ripening, the fruit should be kept dry. Glass copings answer well, and some light netting, suspended in front, and adjusted to the wall at the bottom and ends, but clear of the trees, not only saves the fruit from winged creatures, but insures its ripening equally on the shaded and on the sun side. Birds are very fond of ripening apricots, and must be excluded. Earwigs, ants, woodlice, and slugs also attack the fruit, and should be dealt with as advised on pages 255, 262, 267, and 276 in Vol. I.

The fruit should be gathered if possible dry and cool. It is absolutely necessary that it be dry and not over-ripe for preserving, yet for that purpose it should be fairly matured on the shaded as well as on the sun side. For dessert the fruit cannot be too ripe. It looks more tempting, perhaps, in its brilliant orange or golden yellow than when the skin is slightly shrunk and cracked with lusciousness, but then it is at its prime, and has been fairly described as "one of the finest fruits in the world." The fruit must be handled carefully as it is easily bruised. For packing it should be gathered when it is fairly soft on the sun side and the ripening colour pervades the shaded.

*Unfruitful Trees.*—Those making much breastwood, late growths, or not maturing should have a trench taken out, so as to detach all roots beyond a radius of two-thirds the distance from the stems the branches cover of wall surface. This should be done from the third week in August to the first week in September, according to season and locality, observing to water the soil well inside the trench if the leaves become limp, not otherwise. After remaining open a fortnight to three weeks, the trench should be filled in and the tree pruned, leaving no more spurs or wood than are necessary for next year's bearing, and furnishing the wall. Lift carefully when the leaves commence falling, and rectify any error or neglect of drainage, soil constituents, looseness of staple, or unfavourableness of subsoil. Lime rubbish 6 inches thick is admirable for placing at the bottom of stations. Shorten long bare roots, preserve all the fibrous, pare broken ends smooth, lay the roots near the surface, working good soil well between them, making all firm, and do not cover the uppermost roots deeper than 3 inches. Afford a



good watering, and mulch the surface as far as the roots extend with 2 inches of littery manure. It is not desirable to remove very old trees, but those of ten or twelve years' growth, notwithstanding that they cover a high wall, may be raised and replanted with perfect safety.

*Winter Treatment.*—Untying or unnailing the trees after the leaves fall must be attended to. The wall and trees may be washed with a soft-soap solution, 4 ounces to the gallon of water, as a preventive of insect and fungoid enemies, and all holes in the wall should be stopped with good mortar, or, where the wall is wired, with cement, to close the lurking-places of predatory vermin. Rearrange and adjust the branches and shoots, securing as far as possible a symmetrical and even distribution as best calculated to equalise the sap in the several parts. Allow plenty of space in the ligatures, using soft material, and avoid damage to the bark by bruising or nails. Permitting fruit trees to remain untended until the buds swell gives insects an advantage, and those cultivators attain the greatest success who are well in advance with all necessary operations.

### PRUNING.

This is necessarily determined by the system of culture pursued. Fan-trained trees are pruned on the long, and cordon trees on the short system. These systems have been alluded to under "Training," but further instructions on pruning are needed by the inexperienced.

*Long Pruning.*—By this system the fruit is produced on shoots of the preceding year from a main branch, such as shown (*R*) Fig. 26. It is not stopped unless it exceeds 15 inches, then it is pinched, causing laterals to push. These are stopped at the first leaf and to one of subsequent growth, and cut away in autumn when the wood is well ripened, as indicated by the bars; but if the wood is not ripe at the extremity of the shoot it is cut back, leaving 12 inches of firm wood, as shown by the bar across the shoot.

The following year the shoot just mentioned produces fruit as represented in (*S*); its current growths are closely pinched to one or two leaves as produced, some growths being necessary to attract the sap to the fruit. From the base of the fruit-bearing branch a shoot is encouraged and laid-in along it, and the young shoot is treated similarly to that of the previous year. The bearing branch is cut out after the fruit is gathered, immediately above the current year's shoot, which is to produce fruit the following season, and so on from year to year.



Where space requires filling between the main branches, an eligible side shoot is allowed to extend, and another on the opposite side, which are to form the bearing parts the following year. A branch of the kind described is shown in (*T*), and is termed a

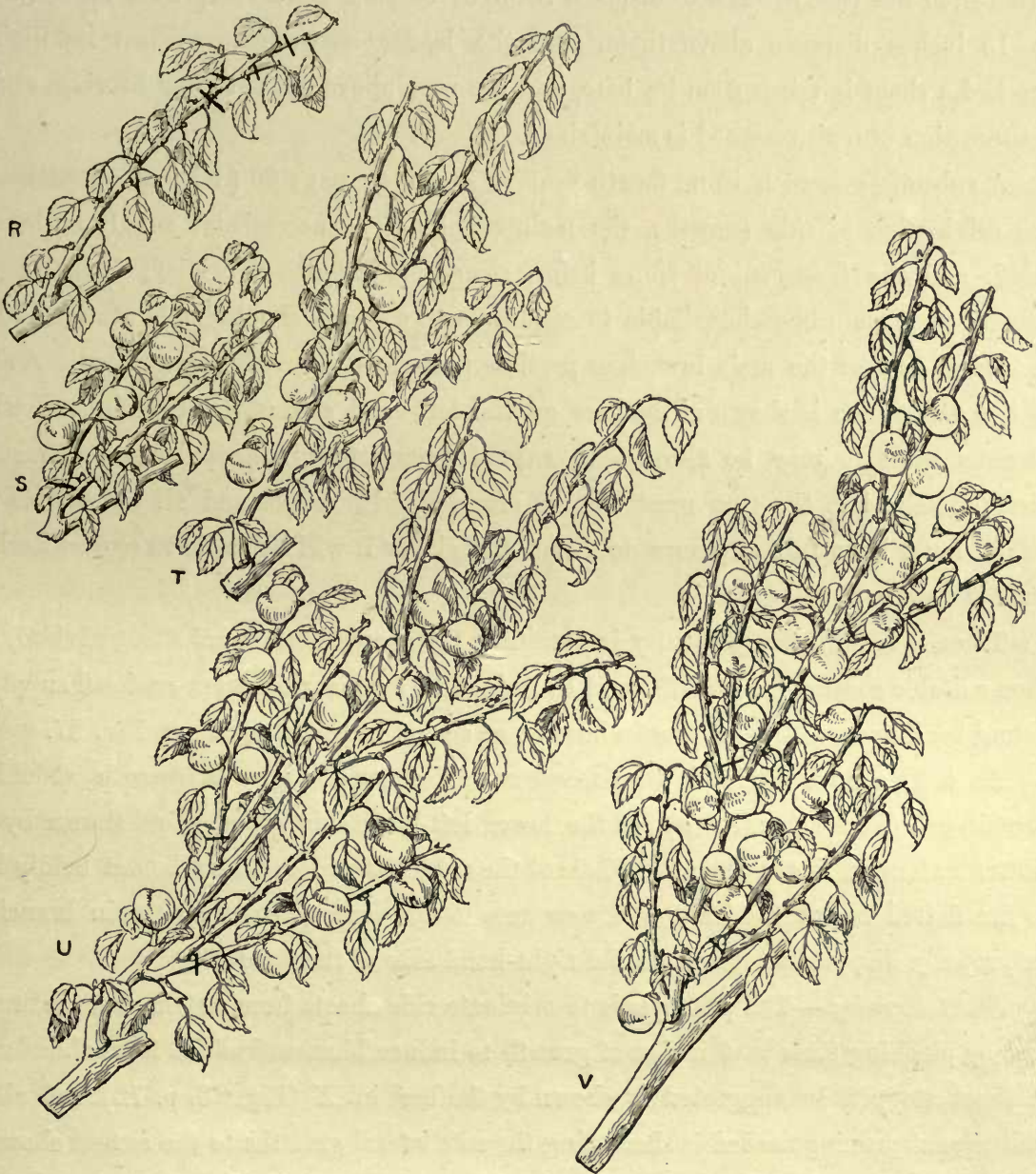


Fig. 26. LONG-PRUNING APRICOTS. (For references, see text)

subsidiary branch, to distinguish it from a main branch. No autumn pruning is required for a subsidiary branch in its second year, unless the side shoots have been stopped, when they are pruned as advised for (*S*); and if the extremity or leading shoot exceed



2 feet in length, and is not well ripened at its point, it may be shortened one-third of its length at the autumn pruning. In the following year the side shoots from the subsidiary branch produce fruit, as represented in (*U*). A shoot is originated from the base of each to displace them in bearing next year, with others at 12 to 15 inches distance above them, and the leader continued. When its limit is reached a shoot is taken from its base, and the part above cut out after bearing, and so a succession of fruiting wood is maintained.

A subsidiary branch in its fourth year is shown on page 69 (*V*), branch extension, the origination of side growths, the maintenance of a successional supply of bearing wood, and the treatment of spurs being clearly indicated. Subsidiary branches are, equally with main branches, liable to collapse, and a young shoot should always be kept in reserve as near the main branch as possible to replace old with young wood. A shoot of this description is shown at the base on the left-hand side of the branch, and where there is space it may be allowed to extend preparatory to supplanting the subsidiary branch; but the tree must not be crowded with wood, and all the shoots and leaves must have full exposure to light and air, or it will be futile to expect healthy, fruitful trees.

There is sometimes a difficulty in obtaining the successional basal shoot advised, and then suitable contiguous growth must be trained in for insuring a successional supply of young bearing wood from the main branch, as shown in the illustration, Fig. 27.

As it is always advisable to remove enfeebled parts, vigorous growth should be encouraged from the extremity of the lower left-hand side shoot, *u*, as shown by the dotted extension lines; then the whole of the subsidiary branch may be cut boldly back to the dotted bar at the base, and new growth encouraged from the main branch, to be properly disposed as shown on the right-hand side of the figure.

*Short Pruning.*—The principle is to originate side shoots from a stem or main branch, and by pinching these at 6 inches of growth to induce blossom buds to form abundantly. A shoot stopped as suggested is shown by the bar in *X* (Fig. 28, p. 72), and all the subsequent pruning needed is shortening the soft lateral growths to the extent shown by the dotted bars. The following year bearing follows, as shown in *Y*, a young shoot being at the same time produced for the succeeding crop, after the old bearing portion is cut out at the bar as soon as the fruits are gathered. The two figures referred to are illustrative of well-managed trees, those to which attention is next directed pertaining to trees in an unsatisfactory condition. When the root action of a tree is too powerful, and no attempt



is made to arrest it, the growths are similar to that represented in *Z*, namely, exuberant but sappy, with the laterals long jointed and thin. In June or later the foliage suddenly flags, and one more instance is pointed out of branches "dying off without cause." The fact is, the cultivation is at fault. The sap had become vitiated, the whole of the tissues were soft through imperfect elaboration and assimilation, and the germ tubes of the fungus *Coryneum Beijerincki* found entrance, producing an exudation, gum, the branch collapsing with its fruits, as represented in *A*. The over-luxuriance—plethora—might have been prevented by root-pruning at the end of the preceding August, and firmer, healthier growth induced.

One great advantage of short pruning is the facility it offers for controlling the roots by lifting, and correcting errors of soil constituents, or staple. So pronounced is the free cropping of trees on this system that it is often abused by the grower. Because a one-year's branch is well furnished with spurs when the fruit is gathered, it is left, instead of being cut out. There would be no harm in that if there were space for it and the successional



FIG. 27. APRICOT BRANCH—TYPICAL GROWTHS AND PRUNING.

*References:*—*W*, part of a main branch, showing side growth and subsidiary branches; *t*, two-year-old wood cut away to the bars; *u*, one year's wood for next year's bearing; *v*, extremity growth of subsidiary branch not pushing side shoots to be cut away to the bar; *w*, a refractory or neglected spur shortened to the bar; *x*, a promising shoot to be encouraged; *y*, shoot pushed from a latent bud.

growths; but mischief results in allowing growths to be made, without cutting any away, for the growths become crowded and attenuated, deriving little, if any, benefit from the wall. No growth ought to remain after the second or third year, then the side branches would never get into the unsatisfactory condition shown on the upper side of the main branch in the figure (*B*), Fig 29.



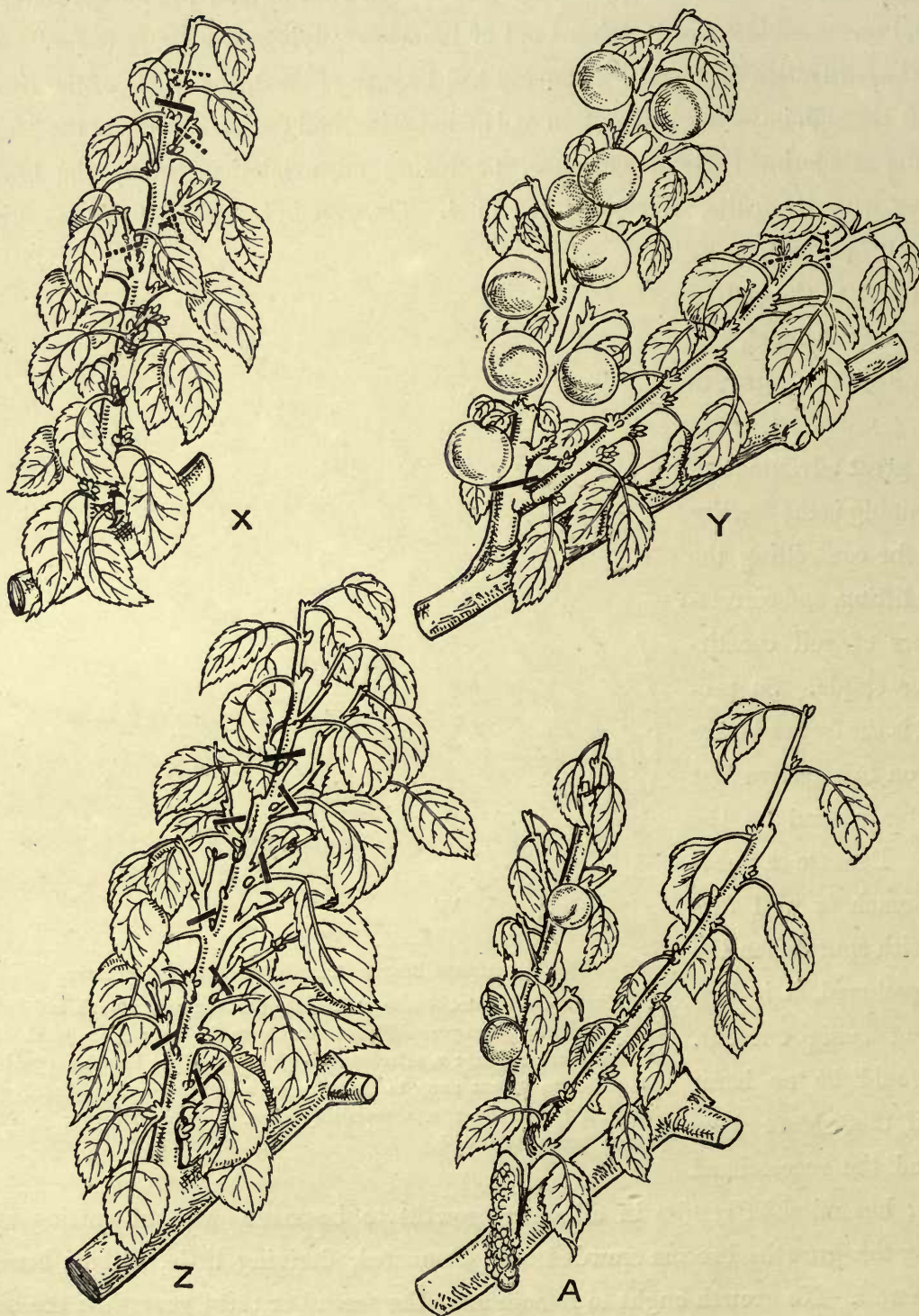


Fig. 28. SHORT PRUNING. (For references, see text.)



When apricot growths are in that plight they should be cut back to the shoots nearest the branch, as shown by the bars, and those retained must be thinned and regu-

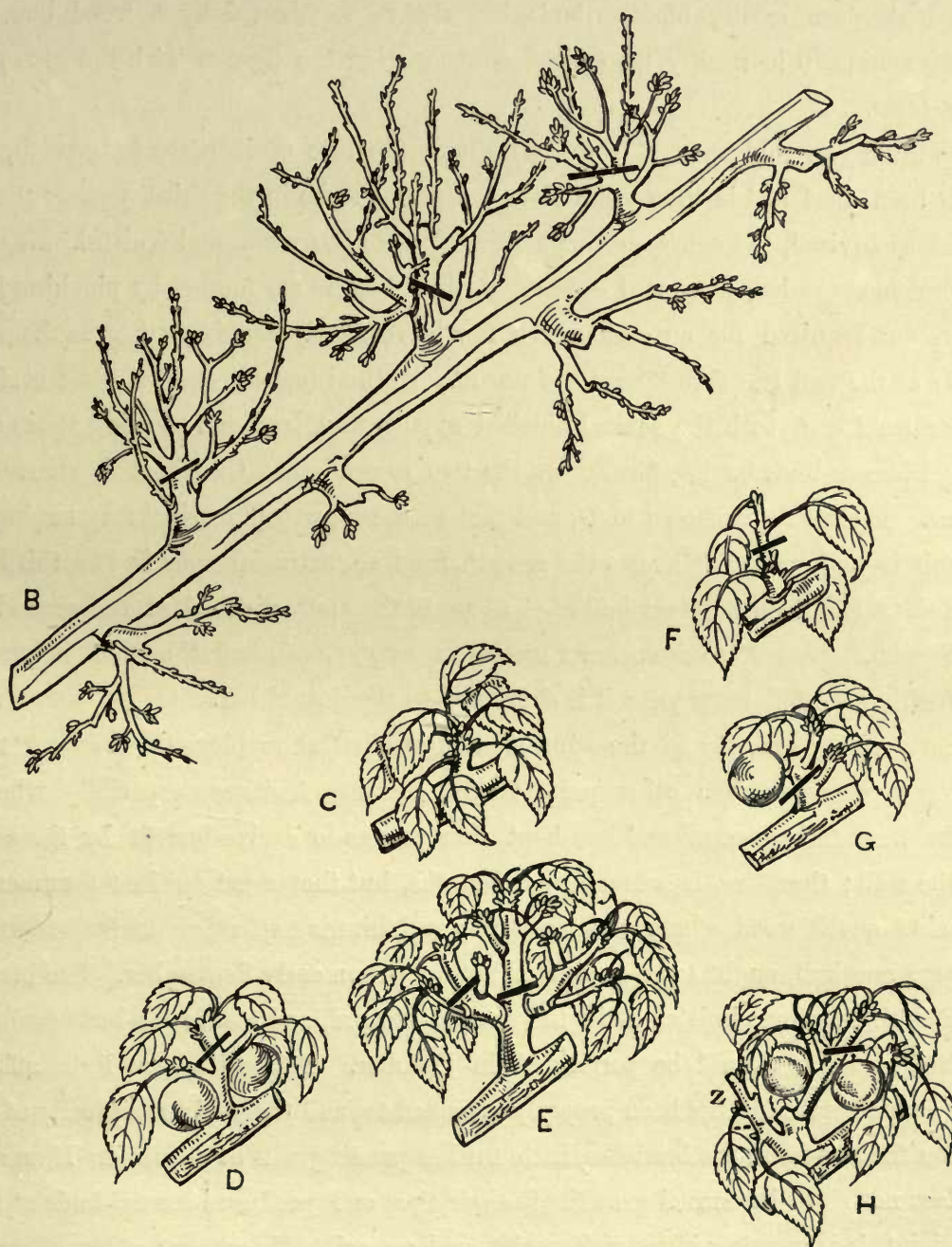


Fig. 29. APRICOT SPURS AND PRUNING.

*C*, natural spur of one year's growth ; *D*, two years' spur, to be shortened to the bar ; *E*, three-years-old spur ; *F*, stopped shoot ; *G* and *H*, resulting spurs, all marked for pruning.

lated, as on the lower side of the branch, wherein is shown a maximum of growths suited to this method of culture in aged trees.



*Spurs.*—Two descriptions of spurs are produced by apricot trees: natural and artificial. A natural spur is a short, stubby shoot, the leaves disposed in a cluster, in the axils of which buds form, mostly blossom-buds, but always terminated by a wood bud. The different spurs will be readily recognised on comparing the figures with the growths on apricot trees.

The three-years-old spur *E* (page 73), shows the rate of increase in growth, it not having been shortened in the second year, but ought to be in the third year to the bars. Treated as advised, the spurs are kept thin, close to the stem, and fruitful. Neglected spurs become crowded, long, and barren. Artificial spurs are formed by pinching shoots that are not required for extension to a few leaves, and stopping all growths subsequently at the first leaf throughout the season. In the illustration, *F*, a shoot is stopped at the second leaf, with the lateral pinched at the first leaf, and pushing again at the next. Blossom-buds having formed at the two lower joints, the shoot is shortened to the bar. The result is shown in *G*, and part of the growth is marked for pruning after the fruit is gathered. *H* shows the growth from an artificial spur in the third year, with a shoot (*Z*) from a latent bud at the base of the spur, pinched at the second leaf. This is not shortened, blossom-buds bristle at every joint, and the wood is hard, but after fruiting the following year it is shortened to the dotted bar.

Short stubby growths of the spur character often show blossom and perfect fruit in adverse seasons, when other parts of the tree are fruitless, especially when the growths have full exposure and are kept short, so as to derive benefit by the warmth from the wall; therefore, encourage such growths, but they must not be too numerous.

Reductions of wood, whether in shortening and thinning spurs, or cutting out growths no longer required, ought to be completed not later than early September. The increased light and air thereby admitted assist the wood to mature, and assure the buds perfecting. The final pruning should be performed in October. This will be a light affair, as where summer pruning has been properly attended to, and there is a reciprocity of action between the roots and the branches, little further pruning will be required. If an apricot tree does not ripen its annual growths to their tips, and produce blossom-buds at almost every joint, it is growing in too rich, moist, or loose soil. No amount of branch pruning will overcome difficulties of that nature, as the spade, not the knife, is the immediate agent that is needed. Many failures occur through mismanagement, but climate has great influence over apricots. In some localities their culture is pronounced a failure; but the real cause of failure may often be traced to excessive vigour and excessive pruning.



When properly managed, lifted and root-pruned trees have proved as remarkable for health and fruitfulness as they were conspicuous before for dying branches and sterility.

#### AIDS TO MATURATION.

*Flued Walls.*—In some elevated and exposed situations in the north apricots were formerly grown successfully against walls artificially heated. They are rare nowadays, due, perhaps, to the cheapness of glass, but where they exist, in addition to the blossoms of the trees being protected by canvas, a moderate fire may be kept going when the nights are severe, yet under no circumstances must the wall be kept more than warm, as violent heating may prove disastrous. With due care heated walls answer admirably for apricots, not only in preserving the blossoms from frost, but by causing the earlier and better ripening of the fruit. A gentle fire, kept going night and day, will cause the fruit to ripen as well upon the side next the wall as on the side exposed to the sun. A partial shade of netting when the sun is powerful prevents premature ripening on the exposed side. With a gentle warmth in the wall apricots ripen three weeks in advance of those against ordinary walls, the fruit is finer, and the trees are healthier.

#### APRICOTS UNDER GLASS.

Practically the apricot resents confinement, and revels in sun and air. Wall cases with a south, south-east, or south-west aspect are necessary in the north and in elevated and exposed situations; those with east and west aspects are suitable in and south of the Midlands. Structures designated wall cases vary in construction and dimensions. Some have upright front lights and short, narrow, sloping roofs, the glass but a little distance from the trees, or sufficient to allow of cultural operations. Other structures have short upright fronts of glass, long roof lights at a sharp angle, short top lights much less inclining, and admit of a path inside. The front and top lights are hinged, opening outwards; the roof lights not available for ventilation. Now, ventilation is vital in apricot culture under glass. A house or wall case with an opening 11 inches wide in front, and a light opening here and there at the top, is useless. The front lights must not be less than 2 feet 6 inches wide or deep, and the top lights must have the same proportion, and both must open outwards by crank and lever, or some other approved mechanism, half their breadth and the whole length of the structure.



The structure may be 7 feet 6 inches wide, in which trees can be trained to the wall. The front trellis should not be more than 6 feet high for a structure 7 feet 6 inches wide, the trellis 9 to 12 inches from the glass. Walls are best wired, the wires not more than 6 inches apart, fixed  $\frac{1}{2}$  to  $\frac{3}{4}$  inch from the wall. A structure of a suitable description is represented in Fig. 30.

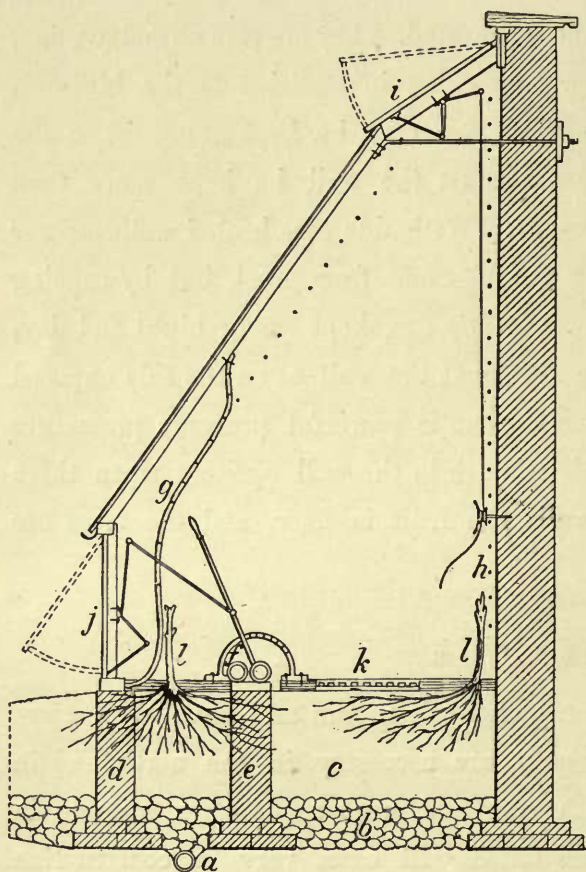


Fig. 30. A WALL CASE FOR APRICOTS.

References :—*a*, drain ; *b*, drainage ; *c*, border ; *d*, 9-inch brick pillars at every upright or rafter, other space open to allow roots to pass outside ; *e*, 9-inch brick pillar at every joint of hot-water pipes, about 9 feet ; *f*, flow and return 4-inch hot-water pipes on the pillars ; *g*, front trellis ; *h*, back or wall trellis ; *i*, top lights with ventilating gear ; *j*, front lights showing ventilation ; *k*, batten pathway ; and *l*, trees.

No plants must be grown in the case, but the whole space ought to be devoted to the trees. A border of 2 to 3 feet, not more, should be kept clear in front of the structure, into which the roots may pass. It is best to train the trees entirely to a roof trellis instead of the wall, which will only be useful as a source of heat absorption and radiation, and in that respect be of great value.

Where walls exist they may be utilised, but they are not needed for glass structures in which fruit is to be grown, as warmth in cold periods is better afforded by hot-water pipes ; and houses that enclose a larger amount of air than do wall cases are safer in cold periods. Wall cases, however, are useful aids in the culture of apricots, and under judicious management, satisfactory crops are grown in them even when unheated. In that case protection must be provided. Nothing answers better than frigi-domo or wool netting, but other materials answer well. Whatever is used must be in two pieces, one

to cover the top ventilating lights, the other to place over the remaining portion of the roof. None is required for the front lights. Both pieces should have rings at the corners and along the sides for placing over hooks fixed in the roof to prevent displacement. When the material gets wet it must be dried, and always ready for an emergency.



The border may be prepared as advised for trees against walls, and it is essential that the roots be under complete control. Trees trained three or four years and lifted annually are the most suitable for planting in glass structures. This should be done early in the autumn, transferring them, if possible, with soil adhering to the roots. The roof lights should be removed when the trees have shed their leaves. Thoroughly cleanse the house, prune the trees, adjust them to the trellis unless the border has not settled, mulch this with manure, as advised for outdoor culture, and nothing more will be needed by the trees until the buds commence swelling in the spring.

Rain or snow will soak the soil through to the drainage. If not, repeated waterings must be given to thoroughly moisten the whole border. When the first blossoms show colour, replace the roof lights, opening the top and bottom ventilators to their full extent, and keep them so when the external temperature is  $40^{\circ}$  or more. Reduce the ventilation to a chink about an inch wide at the top and bottom when the temperature outside falls below  $40^{\circ}$ ; if it fall to  $35^{\circ}$  close the front lights, but leave the top lights open not less than half an inch, and they must always remain so, except when the house temperature is below  $35^{\circ}$ . A still atmosphere is then desirable, and the top lights may be closed, but they must be opened again when the temperature has risen to  $35^{\circ}$ . Open the front ventilators as well as the top when the temperature inside is  $40^{\circ}$ ; increase the ventilation between  $40^{\circ}$  and  $45^{\circ}$ ; do not allow the heat to exceed  $50^{\circ}$  without full ventilation, and close with the reservation of top and front air before named for the day between  $40^{\circ}$  and  $45^{\circ}$ , yet not so early as to raise the temperature above  $50^{\circ}$ , as indicated by a shaded thermometer.

When a sharp frost is apprehended, the protective covering should be placed over the roof. This will only be needed in severe weather, but it is not safe to dispense with it when there is likely to be  $6^{\circ}$  or more of frost. In case of frost by day the protection may remain; never in mild weather or when the sun is not obscured, for the blossom cannot have too much light. In case of continued frosty nights the light covering need not be removed daily from the top lights, and in no case must it be withdrawn until the temperature has risen to a safe degree— $35^{\circ}$ . Then air must be admitted, so that the heat of the house will rise gradually with that of the external-air, before the blossoms are exposed to the full influence of light.

After the blossoms are fully expanded a gentle rapping of the trellis will insure the dispersion of the pollen, or it may be distributed with a camel's-hair brush and applied gently to the flowers, or the blossoms may be brushed over with a bunch of



feathers, a plume of pampas grass, or a rabbit's tail mounted on a small stick. When the fruit is set a light syringing should be given, taking care that the moisture is dissipated before nightfall. A sharp look-out must be kept for caterpillars and other insect pests.

Until the fruit attains the size of marbles the temperature should not exceed  $50^{\circ}$  without full ventilation, having it free at  $40^{\circ}$  and  $45^{\circ}$ . Reduce the ventilation at  $50^{\circ}$ . There must not, however, be any closing of the house, such as is practised with peaches and vines. The apricot is impatient of sudden fluctuations of temperature. With care, however, it is not difficult to manage; air is its chief requisite, and of this it requires more than is good for many fruits. To allow the temperature to rise to  $60^{\circ}$  or  $65^{\circ}$  before increasing the ventilation, and then admit a volume of air, brings the fruit off in showers, and a close atmosphere has the same effect. The apricot loves a hot day and cool night; its foliage detests the perpetual washing accorded to the peach and the stewing granted to the vine, but an occasional cleansing of the foliage by syringing with clear rain water greatly benefits the trees, if they become dry before nightfall. From the fruit attaining the size of marbles to stoning observe  $50^{\circ}$  as the point at which to increase and reduce the ventilation, affording enough at night and in dull periods to insure a circulation of air, but never allow the temperature to exceed  $55^{\circ}$  without full ventilation.

After the fruit has stoned, which is usually in six weeks from its attaining the size of marbles, the temperature may be kept at  $55^{\circ}$  at night with ventilation, and  $65^{\circ}$  by day, not allowing that heat to be exceeded without the maximum supply of air. The fruit will ripen three weeks ahead of that grown against walls. When changing, a thin shade over the roof lights will prevent its ripening unevenly. It should be allowed to remain until quite ripe, even until it shrinks on the side next the sun; then it is simply an unequalled sweetmeat.

Water will be required during growth at fortnightly intervals, more distantly in the early stages, and more frequently during the heat of summer. Liquid manure and surface dressings should be given, as advised for trees against walls; mulching, also, must be attended to, and the border, with other available surfaces, should be sprinkled in the morning and afternoon after the foliage becomes full-sized, up to which stage an occasional damping only is required. Avoid syringing unless red spider appear, but then dislodge it promptly, and supply water or liquid manure more adequately to the roots. When ripening, the fruit cannot be kept too dry, but an occasional damping of the house greatly benefits the foliage, and although less water is desirable at the roots



when the fruit is ripening, it must not be withheld to the extent of causing the foliage to ripen prematurely, but be given as necessary to maintain it in health.

After the fruit is gathered thoroughly cleanse the trees by a few forcible syringings, admit air to the fullest extent, supply water as needed, remove the roof lights when the leaves commence falling, then put all into order for a fresh start when the time comes round. The treatment of trees under glass as regards training does not differ from that of trees grown against walls.

#### FORMS OF TREES.

Apricots are the least cultivated of fruit trees in the shape of pyramids, bushes, and standards. This arises from their moderate and uncertain cropping when grown with other fruit trees. The apricot is an autocrat, it admits no rival, and few have the means to devote a house specially to its culture. Yet a separate house is required; then apricots can be grown successfully, both in pots and planted out. Small houses, however, are very little better aids to culture than walls, and no certainty can be expected from either without means of protection. Glass structures have, if anything, the advantage, by insuring dryness for the blossom, and husbanding the sun heat, whereby better-ripened fruit, firmer wood, and plumper buds are secured.

*Pyramids.*—A maiden apricot tree should be placed in an 11-inch pot directly the leaves have fallen. The pot should have four side and one bottom apertures, each  $1\frac{1}{2}$  inch in diameter. Place one large crock over the bottom, then other large pieces, so as to bring the drainage up level with the top of the side holes, and over these place a layer of steamed half-inch bones. Three parts of good turfy loam laid up sufficiently long to destroy the herbage, torn into pieces the size of a walnut to an egg, one part of sweetened horse-droppings, and one part of old mortar rubbish, mixed, form a suitable compost. Shorten the strong roots, so that the tree can be placed in the pot, with the uppermost roots  $1\frac{1}{2}$  inch below the rim, and the side roots 1 inch from the side all round. Place some rough soil at the bottom of the pot, ram it firm with a stick, have the tree perfectly upright, and press the soil well about its roots, which should be spread out evenly, fill up all the interstices, and finish with the upper roots just covered with soil, one inch below the rim. Water at once, moistening the soil through to the drainage. Arrange the trees in front of a south wall or in a cool house, in either case protecting the roots from frost with dry material placed around and over the pots. Head each tree down to 12 inches of the soil within a fortnight of potting, cut off the laterals close to the stem,



if there be buds on the stem ; if not, cut them back to one joint, and let the trees be assigned their summer position in a light airy house by early February.

Several shoots will push by or before May ; reserve four of the best as side shoots, and one as a leader, rubbing off the rest. Stop the side shoots at 6 inches, and the leader at 9 inches of growth, which will cause them to thicken and push laterals. Select the uppermost from each side branch as a continuation, and pinch all others at the first leaf, treating subsequent growths similarly ; stop the extensions at the third and the second growths to one leaf. If the leader after stopping push three or four shoots, select the best or uppermost for elongation and take out its point at 6 inches, and stop the side shoots originated at the same time at 6 inches of growth, pinching shoots from these at the first leaf. Should the leader push again, pinch it at the third leaf, and to one afterwards. In autumn the tree will have four, perhaps seven, side branches studded from base to apex with blossom-buds, the stem or leader promising fruit. No pruning is required. A pyramid 2 to  $2\frac{1}{2}$  feet in height, and half as much through at the base, trained in the manner described, is represented in *J*, Fig. 31 on the next page.

The following year's treatment is a repetition of the last as regards the leader ; but the side branches are doubled in number by taking two shoots from each, allowing them to extend 6 inches, then treating as before advised. All other shoots are stopped to one leaf, and so on ; shoots of an inch, or not more than 2 inches, are not pinched. No knife is used until it is necessary to thin the branches and spurs, or cut back elongations. Pyramids of any desired size can in that way be formed. Under good cultivation, the trees will fruit in the second year after potting, and be supported by rooting from the pot, as shown in the illustration.

Bush apricot trees are formed in a similar way to pyramids ; the only difference is that there is no central stem from which the branches emanate at regular distances, the trees being lower and more spreading.

*Standard Trees.*—These may have stems of any height, but 3 feet is suitable for growing under glass. A maiden tree, intended to be grown as a standard, should be planted in a light, airy house in autumn, or it may be potted. Cut the tree down 12 inches from the soil. Take the most promising shoot that pushes in spring, and rub off the others. Pinch the laterals to one leaf as produced, not cutting them off until autumn, as they assist the stem to thicken ; but it must be secured to a stake to keep it straight. Shorten the tree to 3 feet in the autumn, making sure of growing buds immediately below the cut. If there be no buds on the stem, then the upper laterals must be left.



In the spring, select three of the most promising growths for forming the head, rubbing off the rest. Pinch the three at 6 inches of their growth, encourage two shoots from each, and pinch these at 9 inches, stopping all laterals from them, or wherever produced, to one leaf; but if the shoots stopped at 6 inches do not push

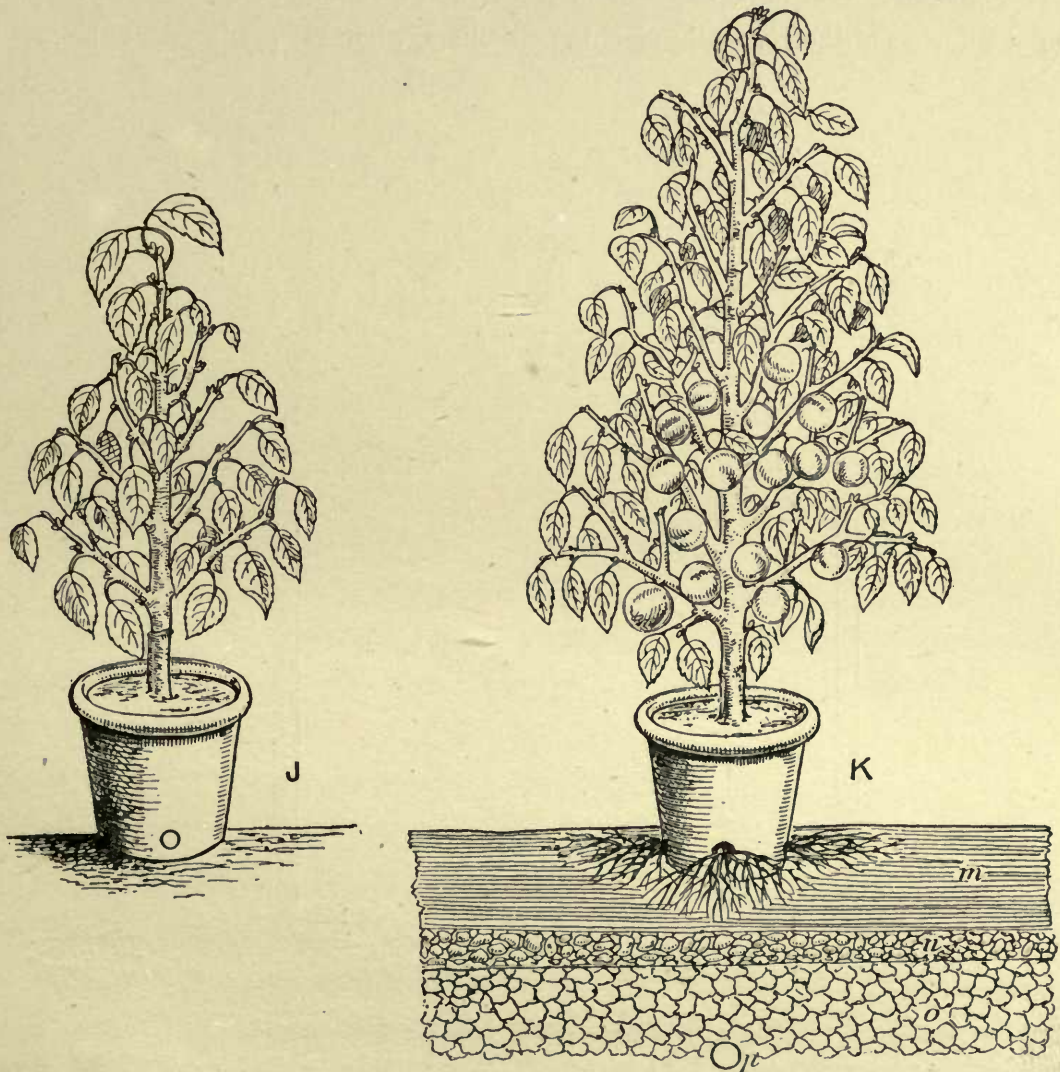


Fig. 31. PYRAMID TREES IN POTS.

*References* :—J, one-year pyramid apricot ; K, fruiting pyramid ; m, 6-inches in thickness of rich compost, in which the pot is placed 1 inch over the side holes ; n, 3 inches of old mortar rubbish ; o, 6 inches in thickness of rubble ; p, drain.

strongly, one growth only should be taken from each, pinching them at 6 inches, and to one leaf afterwards, and so on throughout the season. In autumn, the branches having been forked, and not extending more than 12 inches beyond the first stopping,



no pruning is required; but if the branches are not forked at 6 inches from the stem, they should be cut back to 7 inches; then two shoots will issue from each branch the following year, and if these are stopped at 9 inches, the tree will be in the state represented in *L*, Fig. 32.

The following year take two shoots from the extremity of each branch, and stop them at 9 inches of their growth, pinching all others, wherever produced, at the first leaf.



Fig. 32. STANDARD APRICOTS. (For references, see text.)

Short, stubby growths of an inch, or not more than 2 inches, need not be pinched. In that way the tree is kept well furnished with spurs, and will produce fruit in the second or third year as shown (*M*).

In subsequent years a distance of 9 to 15 inches must be left between the branches for the proper development of spurs. When the trees are as large as desired, they may be kept closely stopped; but it is well to allow some extension each year, even if it be had by shortening some of the branches. Shoots 6 inches in length, originated annually,



keep up a free circulation of the sap, which it is always desirable to maintain. This can readily be effected by allowing young wood from the base of a branch to extend, and then a worn-out branch can be cut away in its favour. In that way standard apricot trees may be kept healthy and fruitful for many years, if crowded spurs are thinned and elongations shortened. By judicious feeding, fine fruit is produced abundantly. Over-luxuriance may be checked by occasional lifting and root-pruning, whilst weakly trees can be invigorated with fresh soil.

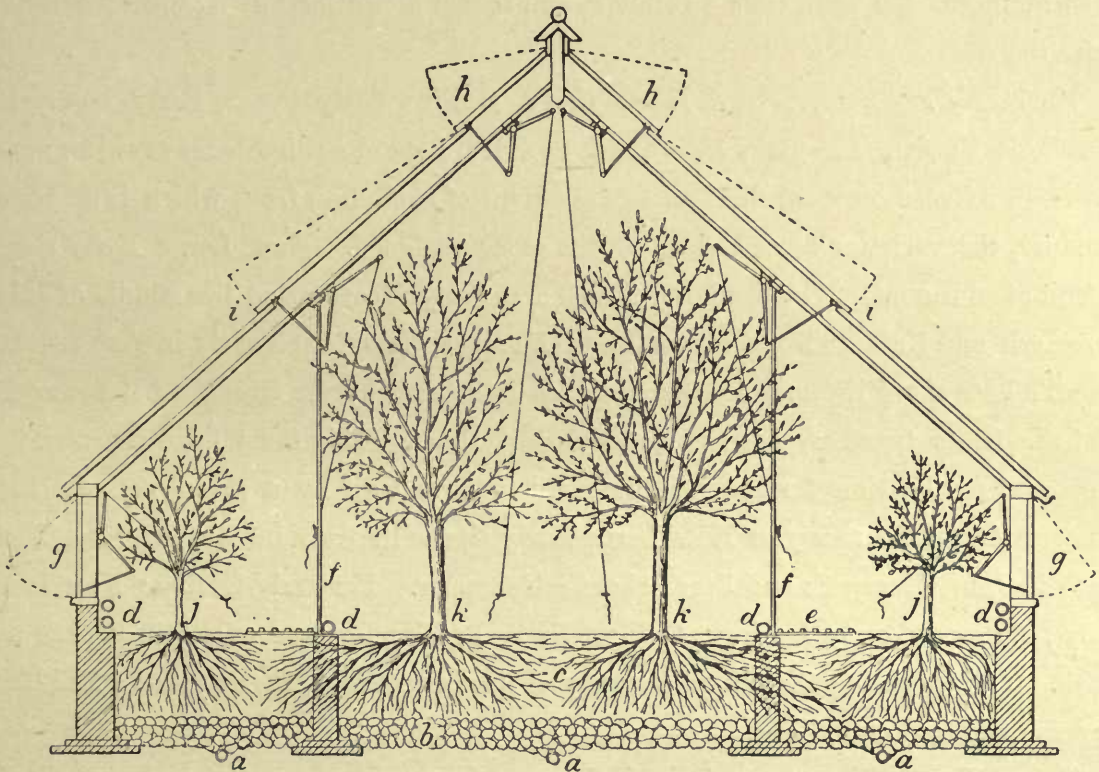


Fig. 33. A SPAN-ROOF HOUSE FOR APRICOTS.

*References:—a, drain; b, rubble; c, border; d, 4-inch hot-water pipes; e, batten pathway; f, iron pillars; g, front lights; h, top lights; i, movable roof lights, upper lights opening as shown; j, trees on 18-inch stems; k, trees on 3-foot stems, ends of structure north and south.*

Although the finest fruit is borne on trees trained to trellises near the glass, the apricot succeeds admirably grown as dwarf standards planted out, or in bush, pyramid, or standard forms in pots or tubs. Trees grown in these shapes present a great extent of surface to light, and if they receive it unobstructed through clear glass they produce large crops of good fruit.

#### FORCING APRICOTS.

Wall cases with the trees trained to the wall are not suitable for early forcing;



but when the trees are grown on a trellis 9 to 12 inches from the glass they are very eligible. The structure figured on page 76 and furnished with a flow and return 4-inch hot-water pipe its whole length, as shown, answers well. Apricot trees succeed better on a roof trellis than against a wall several feet from the glass, and a structure with a sharp inclining roof affords a larger extent of trellis than a comparatively flat-roofed structure, the width being equal, and presents the glass at a better angle for light passing through it. Two lean-to cases (page 76) joined together, back to back, minus the wall, form a suitable span-roofed house for forcing apricots trained under the roof.

*Varieties for Forcing.*—New Large Early, Oullins Early Peach, Early Moorpark, Hemskerk, Kaisha, Moorpark, Peach, and Powell's Late are suitable for growing under glass. In a house accorded fire heat to the extent of excluding frost, which is a forcing structure, the varieties named ripen in the order assigned. New Large Early ripens its fruit at midsummer; Oullins Early Peach and Early Moorpark at the middle of July; Hemskerk and Kaisha at the end of July; Moorpark and Peach early in August, and Powell's Late about the middle of August, as influenced by the season. All flower and set their fruits together, but ripen at different times. This must have consideration in calculating the time for starting the trees to have fruit by a given period. In a house started at the new year New Large Early ripens its fruit in May, Oullins Early Peach in June, Moorpark and Peach about midsummer. For early forcing: New Large Early; for second-early forcing: Oullins Early Peach; for succession: Moorpark and Peach. All grown together afford a supply of fruit over six weeks or more. Kaisha is very suitable for low trellises.

*Trees.*—For trellises trees trained three or four years to walls, and periodically lifted, are most suitable for planting. They should be moved when the leaves begin falling, transferring to the structure with balls of soil, and all the roots practicable, affording a good watering. Young trees answer, but entail a needless waste of time. Pyramid, bush, and standard trees in pots should be planted early in September. Disentangle the roots at the side of the ball, remove the drainage, plant firmly, and apply water copiously. Trees moved early will become established quickly, and may be forced the following year, but it is better to bring them on very gently the first year.

*Starting.*—To have fruit in May the house should be closed at the new year; for a June supply commence in February, and for July fruit the house must be closed early in March. The trees must be thoroughly established, the roof lights removed when the



leaves begin falling, and everything then put in order. Rains will have moistened the soil through to the drainage; if not, afford water to effect it. In case the blossom-buds swell before the time arrives for starting, the lights must be replaced, ventilating to the fullest extent, closing during frost, and affording heat only to prevent the temperature falling below  $35^{\circ}$ .

For advancing growth follow generally the instructions given on page 77. In forcing apricots the first time the trees must not be brought too rapidly into flower, but the buds should be allowed time to swell and develop bold flowers steadily, or, in other words, the forcing ought to be slow, particularly in the early stages. This is absolutely essential, and reliance should be mainly placed on the heat of the sun, affording no more artificial aid than is sufficient for the steady progress of the trees. No acceleration of the ripening must be attempted until the fruit is stoned, and then the artificial temperatures stated are high enough, but with the crops advancing the apricot will endure any amount of sun heat, with the important proviso, full ventilation.

To summarise, in forcing trees started at the new year, the temperature during the first fortnight should be kept at  $35^{\circ}$  to  $40^{\circ}$  at night, and  $40^{\circ}$  to  $45^{\circ}$  by day, ventilating fully at  $50^{\circ}$ . In the second fortnight a temperature of  $40^{\circ}$  to  $45^{\circ}$  at night and  $50^{\circ}$  by day should be maintained. When in flower the night temperature should be  $45^{\circ}$  to  $50^{\circ}$ , and  $50^{\circ}$  to  $55^{\circ}$  by day, ventilating freely at  $50^{\circ}$ , and on cold nights the temperature should be  $5^{\circ}$  less, also  $5^{\circ}$  less by artificial means on cold dull days. By early March the fruit will be the size of horse-beans or hazel-nuts, and advancing rapidly in swelling. The night temperature may then be  $50^{\circ}$  to  $55^{\circ}$ , and the day  $60^{\circ}$  to  $65^{\circ}$ . In favourable seasons the stoning of the early varieties will be completed early in April, when the temperature at night may be raised to  $60^{\circ}$ , falling  $5^{\circ}$  by early morning;  $60^{\circ}$  to  $65^{\circ}$  on dull days; but with sun,  $70^{\circ}$  to  $75^{\circ}$  may be allowed, with full ventilation.

Attention must be given to watering and damping. An occasional syringing up to the time of the fruit changing colour is beneficial, but when ripening commences syringing the trees must be discontinued, damping the floors, walls and border in dry weather instead.

When the fruit is gathered the trees must not be subjected to a low temperature suddenly, but the heat should be lowered gradually, then full air admitted constantly. When the wood is ripe and the blossom-buds prominent, over-maturity should be prevented by taking the sashes off the roof.



## DISEASES.

Though the apricot is subject to few diseases, it suffers more from that termed "branch-dying" than do most fruit trees. Grown under glass or against walls outdoors, apricot trees lose branches suddenly, often when laden with fruit; leaders collapse in young trees, main branches perish here and there in trees just coming in to profit, while those having covered their allotted space lose one branch after another till the trees are spoiled. Sometimes the disease is seen to be gum; in other cases there is no outward indication of that disease beyond shrinkage in the branch and smallness of foliage above the point of collapse; while in some instances there is no visible sign of damage except a few small holes in the branch where it dies off. These symptoms, however, equally with the first, afford evidence of gum disease closing the channels of the wood and thus preventing the nourishment of the branch above the point of infestation; in fact, 99 per cent. of the cases of "branch-dying" are due to gum disease, caused by the fungus *Coryneum Beijerincki*. The cultural inducements to gumming are planting in over-rich soil, the production of gross wood, the severe cutting back of the growths in summer so as to suddenly expose the branches to the sun whereby the bark is hardened, and a sappy condition of the wood which then suffers from frost, combined with severe winter pruning. Careful culture is the best means of preventing the evil in question, and to this end the cultural instructions have special reference. Gum disease, *Coryneum Beijerincki*, is fully treated on page 234, Vol. I.

Clean culture is recommended with the removal of infested parts, spraying before the buds swell with a solution of sulphate of copper, 1 pound to 25 gallons of water; and subsequently with carbonate of copper in suspension, 1 ounce first well stirred in a small quantity of water, and the mixture thus formed added to 12½ gallons of water, spraying first when the fruit is the size of horse-beans, next in 12 to 15 days, and again, if needed, 15 to 21 days after the second application. Ammoniacal carbonate of copper solution, Vol. I., page 241, or modified Eau Céleste, Vol. I., page 242, may be used for spraying, first ascertaining, by experiment on a small scale, the safe strength at which to apply them to the whole tree without injury to the foliage and fruit.

*Mildew* (*Oidium Species*).—The *Oidium* of the apricot is probably an early condition of a fungus named *Podosphœra clandestina*, or *P. oxyacanthæ*, a common parasite of the hawthorn. It is a powdery mildew, with a life history similar to that explained under "Mildew," Vol. I., page 245. It infests the leaves and young growths of the apricot, causing the former to curl and the latter to be distorted. Culturally mildew



may proceed from a confined and damp site, over-wetness of soil, or their opposite extremes of exposure, poverty, and dryness. Thorough syringings wash off the fungus spores, and dusting every affected part well by flowers of sulphur checks the parasite; two dressings at intervals of a few days, followed by two or three copious syringings, generally suffice for removing the mildew throughout the season. The bisulphide of calcium solution, Vol. I., page 248, is more efficacious than dry sulphur; as also is sulphide of potassium,  $\frac{1}{2}$  ounce per gallon of water, applying these as advised in the article, "Mildew," referred to on the preceding page.

*Blister.*—Apricot leaves sometimes curl up and present a similar appearance to peach leaves that are affected with the disease called "blister," but we have not found any fungus on apricot growths, except the mildew already alluded to, and this is the cause of apricot growths being crippled in cold springs where efficient protection is not afforded. Projecting wood or glass copings, affixed to walls, with canvas in front of the trees, not only safeguard the blossoms and tender fruit against the injury from cold, but practically prevent fungus spores from gaining a seat on the growths. Trees against buildings are seldom affected with mildew, because the projecting eaves, and consequently drier and warmer wall surface, keep the foliage dry, also the blossoms and fruit safe from frost. Trees against garden walls, unprotected and without projecting copings, are often fruitless, and the foliage infested with mildew, because they are saturated at night with dew, or coated with frost in the spring, both remaining long into the day and catching fungus spores. Efficient protection without "coddling" is the best preventive of leaf curling and shoot distortion in apricot trees.

*Spot in Fruit.*—A fungus (*Glæosporium læticolor*) causes the pale salmon-coloured depressed mouldy patches on half-ripe apricots and many other fruits. It will be more fully treated under "Peach Diseases." The fungus attack first appears as a small speck, generally at the apex of the fruit, and, spreading rapidly, destroys it for use before it is ripe. It is recommended to spray the trees whilst quite dormant with a sulphate of copper solution, 1 pound to 25 gallons of water, or sulphate of iron solution, 1 pound to 15 gallons of water, as a preventive. All affected fruit should be collected and destroyed by fire.

#### ENEMIES.

Though the apricot is the first to open its flower-buds and push growth, it is less liable to suffer from attacks of aphides than other fruit trees; in fact, it is rarely infested



by aphids, red spider, thrips or scale, and infestation by those insects is due to extreme neglect in management. Aphides are easily destroyed by tobacco water, or dusting with snuff or tobacco powder. Red spider succumbs to the bisulphate of calcium solution, but occasional thorough syringings with water, generous treatment at the roots, and avoiding over-cropping are certain antidotes against the pest. Thrips perish under tobacco smoke, or tobacco water, but where cleanly culture obtains there will be no thrips. The apricot is sometimes beset by a boat-shaped scale, *Lecanium* species, nearly  $\frac{1}{4}$  inch long and  $\frac{1}{8}$  inch wide, brown, darker in the centre, lighter at the edges, and when reaching maturity, somewhat rounder and wrinkled. The eggs hatch in May, and the brood is produced in a few weeks. The best remedy is the resin compound, Vol. I., page 261, applied with a small brush to the scale whilst young. If allowed to become hard the scale should be removed with a knife, collected and destroyed, washing the place with a solution made by dissolving 3 or 4 ounces of soft soap in a gallon of hot water.

*Red-Bud Caterpillar Moth* (*Spilonota ocillana*; syn.: *Pyralis luscana*).—Insect narrow-winged, grey, with whitish band, dotted with grey; it appears at the end of summer, and lays eggs upon the buds. These hatch early in spring, and the caterpillar, fleshy red, black head, with a dark line down the back, attacks the blossoms or the leaf-buds, preferring the former, and feeds inside the bud, some trees having the greater part of the buds destroyed by the tiny caterpillar. Its presence in a bud is indicated by a sticky exudation, and Kollar recommends lifting out the caterpillar by using the point of a penknife, as it cannot be reached and destroyed by a wash. This is an excellent plan to pursue with apricot, plum, pear, and apple buds, making a patient examination of them when swelling, and should the edge of the calyx be sticky, the enemy may be suspected. After feeding four or five weeks on the buds, and full fed, the caterpillar spins a whitish cocoon upon some twig, becomes a chrysalis, from which the moth emerges towards the end of summer. Spraying the trees whilst quite dormant with the caustic soda and potash solution, Vol. I., page 251, detaches, if not destroys, the eggs. Dusting the trees, whilst damp, with freshly-slaked lime when the buds commence acts as a preventive, and if repeated occasionally, hinders the migration of the caterpillars swelling from bud to bud. Those are the only remedies, except catching the moths.

*Apricot Moth* (*Tortrix* (*Ditula*, *Pœdisca*) *angustiorana*).—This insect is also called the Vine Moth, because its larvæ occasionally infest grapes in vineries, first eating the skin of the berries, and then wrapping them in a web. The caterpillars, however,



usually feed on the foliage of fruit trees, especially the apricot and pear. They appear during May and June, and are  $\frac{1}{2}$  to  $\frac{3}{4}$  inch long, yellowish-green with brownish head, and a few hairs scattered over the body. It is a very active creature, wriggling about in varied contortions when disturbed, crawling backwards or forwards with equal facility, and lets itself down by a fine thread from its mouth. It ties two or more leaves together by their extremities, causing them to curl, but is sometimes content with a single leaf, in which it encases itself. If the first-seen rolled-up leaves are pinched, the caterpillar within each roll is destroyed, but other rolled-up leaves appear

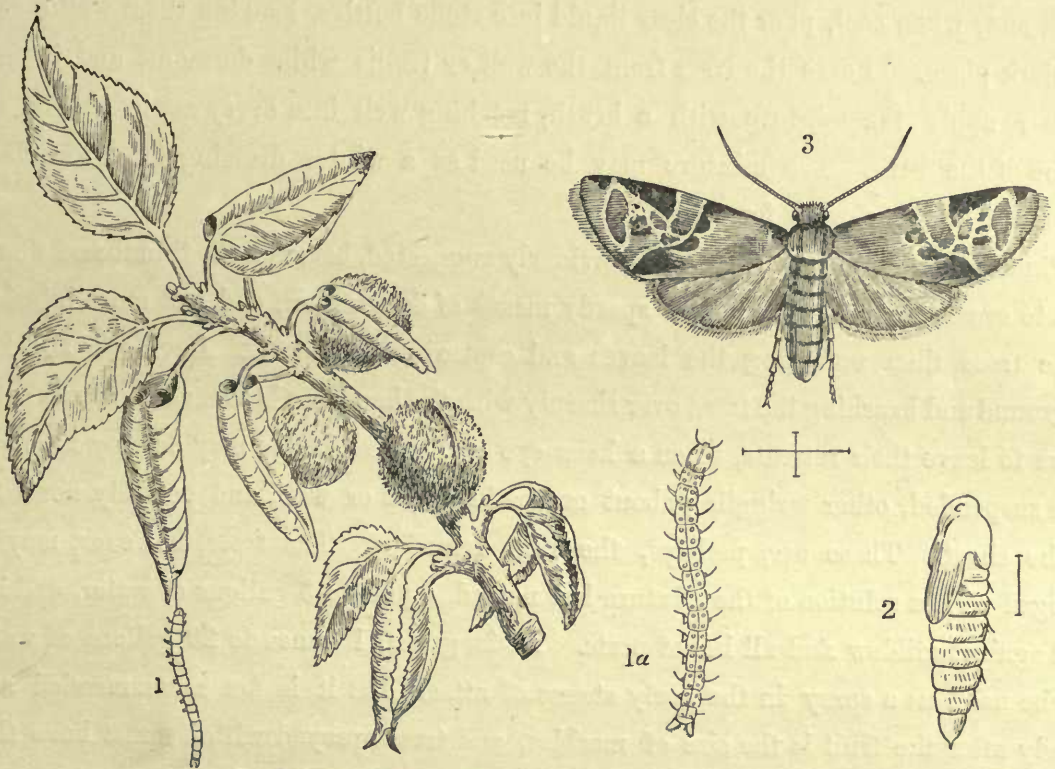


Fig. 34. APRICOT MOTH (*TORTRIX ANGUSTIORANA*).

References :—1, larva, natural size ; 1a, larva, enlarged ; 2, pupa, magnified : line on side, natural length ; 3, moth enlarged : lines below, natural length of body, and expanse of wings.

successionally, indicating that the hatching of the eggs continues for some weeks. When full-grown the caterpillar fastens some remnants of leaves together, and passes into a brown shining chrysalis, and from this the moth emerges in July and later. The moth is  $\frac{1}{4}$  inch long, and  $\frac{1}{16}$  inch in expanse of fore-wings, which are ochreous in the males, reddish-brown in the females, both having darker markings and spots irregularly scattered over the outer half of the wings. The eggs are deposited upon twigs towards the end of summer, some later than others, where they remain till hatched. The cater-



pillars appear with the leaves of the apricot, and cause them to fold over. This rolling of the leaves is shown in the illustration.

By causing the leaves to curl and feeding upon them the caterpillars do considerable injury. Winter dressing trees that are liable to be attacked is the best preventive. The following mixture may be used:—Sulphur vivum, 7 pounds; quicklime, 7 pounds. Slake the lime, and place it in an iron pot along with the sulphur and 3 gallons of water. Mix and boil 15 minutes, then add soft soap 2 pounds, strong shag tobacco 1 pound, and, after adding 9 gallons of water, boil all together 30 minutes, stirring well all that time. Strain and, when cool, pour the clear liquid into stone bottles, keeping them well corked in a dark place. Loose the trees from the wall or trellis while dormant, and in mild weather apply the mixture with a brush, reaching well into every angle, cavity, and crevice of the bark. The mixture may be used as a winter dressing for all kinds of fruit trees, also as a wash for walls.

Pinching the rolled-up leaves, as previously suggested, between the thumb and finger, so as to crush the caterpillars, is a speedy means of destruction, and not more injurious to the trees than unfolding the leaves and capturing the larvæ. Laying a sheet on the ground and brushing the trees over sharply with the hand or a broom causes many caterpillars to leave their retreats, when a keen eye and active hands may destroy numbers, some suspended, other wriggling about on the branches or wall, and possibly not a few on the sheet. These are, perhaps, the best remedies. The trees, however, may be syringed with a solution of the mixture last named,  $\frac{1}{2}$  pint to 3 gallons of water, and it is good against mildew and all insect pests. Paris green, 1 ounce to 20 gallons of water, may be used as a spray in the early stages of attack, but it is not recommended as a remedy after the fruit is the size of marbles, and trees sprayed with it must have their fruit thoroughly washed before being used for tarts or allowed to ripen.

Apricot trees are occasionally infested with the larvæ of various other moths, but these are not common, and it is only when food of a special kind fails that caterpillars migrate, or moths deposit eggs on alien trees.

*Apricot Weevil*; syn.: *Red-legged Garden Weevil* (*Otiorhynchus tenebriosus*).—One of the largest and most destructive of weevils, with short beak, length  $\frac{1}{2}$  inch, black and shining when adult, but reddish and dotted with yellowish down when young, legs reddish brown, beak slightly ridged, and notched at the tip. The beetles feed on the buds, young shoots, bark, leaves, blossoms, and young fruit of all kinds of fruit trees, but are the most prevalent on those against walls and under glass. The female is said



to deposit its eggs a little below the surface of the soil in June or July and later, the first grubs being hatched out in August, and from that time until the following spring feed on the roots of their food-plants, particularly currants, gooseberries, raspberries, and strawberries. The larva changes to pupa in March or early April, and in a fortnight emerges as a beetle without wings. That is very important, and is taken advantage of in capturing the weevils at night, sheets being laid under the trees beforehand, and then, by the aid of a bright lantern, the boughs are sharply shaken, and the contents of the sheets thrown into boiling water. Some other beetles are also captured at the same time, for the habits of the species in the genus *Otiorhynchus* are very similar, and the same methods of destruction apply to the whole. The beetles lurk by day among dead leaves, in the soil, beneath stones and clods, in holes in walls, under loose mortar, anywhere out of daylight. Closing all holes in walls, and removing loose mortar or bark prevent their harbouring close to their food; clearing away stones and breaking clods inconvenience them. Then slates, boards, or sacking placed on the ground near their haunts and examined daily, soon effect a riddance, particularly if baited as advised under "Beetles and Woodlice," Vol. I., page 262. The beetles go down cracks or clefts in the soil, such as occur by walls, and in these they may be killed by pouring diluted gas liquor into them, and damping the surface of the ground with it through a rose watering-pot a yard or more outwards from the wall, giving enough to moisten the surface well. The gas liquor must be diluted with six times its bulk of water. Guano, 2 ounces to a gallon of water; sulphate of ammonia, 1 ounce per gallon of water; also soot water, used in the same manner as gas-liquor dilution, are useful applications. The ground may be sprinkled with nitrate of soda at the rate of  $1\frac{1}{2}$  pound per rod, or 1 ounce per square yard, which the beetles detest, and it kills their larvæ, while the trees profit by the dressing. It may be applied in late March or early April as a preventive, later as a remedy. After midsummer it is not usually desirable to apply nitrate of soda, but in special cases it may be used in August for the destruction of larvæ. A dressing of salt, 7 pounds per rod, given in October, and double the quantity along the foot of walls, kills many beetles or larvæ below. Salt, however, must not be used excessively over fruit-tree roots, and very sparingly near the stems.

If the soil round the trees is taken off 4 inches deep in October, and carried away, many beetles, eggs, and larvæ are removed. Supply fresh loam in place of that removed. It is a good plan to syringe wall trees before the buds swell with a petroleum emulsion,  $\frac{1}{8}$  pint (wine-glassful) to 3 gallons of water. This renders the wall



as well as the trees obnoxious to insects, and spraying the trees with it occasionally afterwards to keep a scent of petroleum on them, is a deterrent of all leaf and fruit-eating pests. A sticky band placed around the stem prevents the beetles ascending it to their feeding-grounds, and a line drawn along the base of the wall an inch wide checks them, but they will go a long way round to reach their favourite food.

The larvæ of the Redbelted Clear-wing Moth (*Sesia myopæformis*) by feeding in the wood occasionally cause the branches of apricot trees to die suddenly, but the chief attacks of this insect are directed to pear trees. The branches of apricot and stone fruits generally are often preyed upon by the larvæ of the Bark Beetles (*Scolytidæ*), but they seldom attack healthy trees, preferring those which have the bark dried by checks to growth or exposure to sun. The most injurious are *Xyleborus dispar*, Vol. I., page 263, and the Plum-tree Bark Beetle (*Scolytus pruni*), to be referred to under "Plum Enemies."

Ants occasionally attack the blossom of apricots and make sad havoc of the fruit, Vol. I., page 256. Earwigs also eat the flowers. For remedies, see Vol. I., page 267. The slender-bodied centipede, *Anthronomalis longicornis*, creeps up at night to conceal itself in the ripening fruit, in which it is sometimes sent to table undetected. See "Millipedes," Vol. I., page 268. The greatest gourmands of ripening apricots are wasps and bluebottle flies, Vol. I., page 279. These take advantage of the nocturnal injuries inflicted on ripening fruit by earwigs to complete its destruction.



## BANANAS.

THE Banana fruit, occasionally seen on the stalls of street-side vendors and commonly in fruiterers' shops, is mainly produced in the West India Islands and upon the Central American coast. The green fruit can be used as a vegetable by peeling off the skin, then washing, boiling, and serving it whole with melted butter, or mashed. When ripe, the fruits, after peeling, may be placed in a dish, and have butter and sugar, which have been rubbed together, poured over them; then baked as pies. They are very delicious done in this manner. Thoroughly ripened and freshly-gathered fruits are valued for the dessert. They are sweet, buttery, and nutritious. The banana has been not inappropriately described as "the Prince of the Tropics."

### VARIETIES.

Many are grown in the West Indies and other tropical countries, the following being a selection of the best for cultivation in this country:—

MUSA SAPIENTUM; VARIETY MARTINIQUE (Jamaica, Yellow Costa Rica).—Leaves deep green, oblong, 8 to 10 feet long, and 1 foot or more wide. Height, 20 feet. A good bunch of fruit contains over a hundred "fingers," each 4 inches long or more, and  $1\frac{1}{2}$  inch in diameter, weighing at least  $\frac{1}{2}$  pound; skin clear golden yellow, thin; flesh firm, yet tender, buttery, melting, rich, vinous, and aromatic. Specimen clusters weigh 70 to 80 pounds, yet 60 pounds is a fine example bunch of this royal fruit.

M. SAPIENTUM; VARIETY, THE LADIES' FINGERS.—Fruit medium size, pointed; skin very thin; flesh tender, with a rich aromatic flavour. This variety is extensively grown in Brazil, and proves the most highly flavoured of all bananas grown in this country. It has been successfully cultivated at Earl Cowper's, Panshanger, Hertford, by Mr. J. Fitt. The Ladies' Fingers banana is a more slender plant than the Martinique, and requires higher cultivation. Height, 16 to 20 feet.

M. CAVENDISHI (DWARF OR CHINESE BANANA).—Leaves deep green, oblong, 2 to 3 feet or more long,

1 to 2 feet wide; height, 8 to 10 feet. Bunch large, hanging nearly to the ground; pods long and thick; skin yellow, rather thick; flesh firm, melting, buttery, and well-flavoured. A cluster of fruits has been exhibited weighing 90 pounds, and even heavier weights of a single bunch have been recorded.

M. CAVENDISHI; VARIETY REDSKIN.—Stronger growing than M. Cavendishi, bearing large bunches of handsome orange-coloured fruits, not equal in quality to the Martinique, yet superior to M. Cavendishi. The variety represented in the coloured plate facing page 94 was grown in the Duke of Northumberland's garden at Syon House, by Mr. G. Wythes.

THE APPLE BANANA.—Probably a cross between M. sapientum and M. Cavendishi. The plant is slender; bunch medium sized; pods about the length of a person's middle finger, pointed; skin clear, yellow, thin; flesh tender, melting, rich, aromatic, and very delicious. This variety grows to a height of 12 to 16 feet, and is similar to the Ladies' Fingers variety.



## REQUIREMENTS OF CULTURE.

*Musa sapientum* and its varieties, Martinique, the Ladies' Fingers, also the Apple variety, need lofty structures. A house 24 feet wide, 15 to 18 feet high at the sides, and 21 to 24 feet from the floor to the ridge, accommodates two rows of plants in a bed 12 feet wide in the middle of the house. This bed should have a  $4\frac{1}{2}$ -inch wall up the centre, and be divided into rectangular compartments by cross-walls at every 12 feet. Six feet space all round the bed remains for paths, but granadillas may be grown on one side of the house, trained to a trellis 9 inches from the glass; and monstera on the other, trained to the wall, or to hardwood tree-trunks set about 9 feet apart. This arrangement occasions the placing of the hot-water pipes in channels below the floor, covered with iron gratings, eight rows of 4-inch pipes being required on each side.

*M. Cavendishi* is the most cultivated in this country. Plants grown in pots or tubs produce fruit in twelve to eighteen months weighing 18 to 24 pounds per plant. A plant in the corner of a stove, where it received rough treatment and the leaves broken, bore a cluster of 136 fruits, weighing  $27\frac{1}{2}$  pounds, in eighteen months; another small plant set in April, in a narrow bed, with ample room for its splendid foliage, gave, in the following April, a bunch of 126 fruits, weighing  $36\frac{3}{4}$  pounds. The cultivator, however, should aim higher, for clusters of 212 to 220 fully-swelled fruits, weighing 50 to 56 pounds, free of all superfluous stem, may be grown in narrow beds in a house devoted to banana culture; and with a sufficient number of plants fruit may be had at all seasons, for the period of bearing depends upon the time of planting. The heaviest bunch grown in this country was exhibited at a meeting of the Royal Horticultural Society on May 8th, 1877, by Mr. J. Ollerhead, gardener to Sir Henry Peek, Wimbledon House. It weighed 97 pounds, and a gold medal was voted to the cultivator. The chief desiderata are: 1, rich compost in a limited area, giving complete control over the growth; 2, high feeding at the right time; 3, proper space for development; 4, unobstructed light, and close proximity to the glass without touching; 5, free ventilation; 6, ample heat.

*Propagation.*—All the varieties are readily increased by suckers, but those appearing on plants in bearing, and not needed for stock, should be removed. This assists the fruit in swelling and perfecting. Strong suckers should be taken off and potted, yet allowing them to obtain a good size and become well rooted before detaching from the parent. Suckers, however, do not always appear before the fruit is cut. Then cut off the leaves and leave the stump, which will soon produce offsets for potting; or the old



plant may be taken up, partially disrooted, potted, and plunged in a bottom heat of  $85^{\circ}$  to  $90^{\circ}$  to produce suckers. These are removed and placed in 6-inch pots, shifted into 8 or 9-inch pots when established, and, when 2 to 3 feet high, with well-developed foliage, transferred to the fruiting-pot, tub, or bed.

*Compost.*—Sweet, moderately rich soil, permeable by the roots, is essential, as sour, excessively rich, close, sodden compost is fatal to healthy growth and fine clusters of

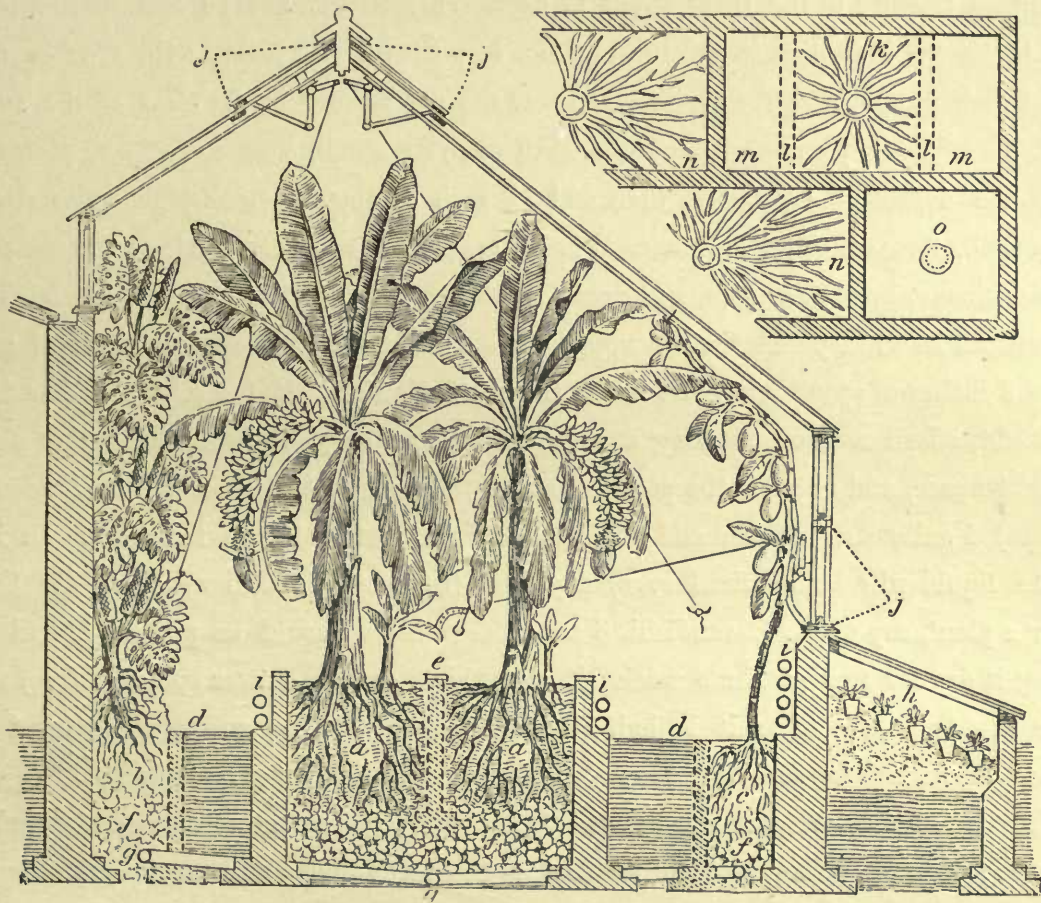


Fig. 35. BANANA HOUSE.

Section through G 2, Ground Plan, Vol. I., page 71. (Scale:  $\frac{1}{4}$  inch = 1 foot.)

*References:*—*a*, narrow borders for plants; *b*, narrow border at 9-feet intervals for *Monstera*; *c*, narrow border at ends only for *Granadilla*; *d*, paths; *e*, dividing wall up centre of bed; *f*, drainage; *g*, drains; *h*, cold pit; *i*, hot-water pipes; *j*, dotted lines indicate ventilation. Detached plan shows: *k*, restricted root-space at planting; *l*, temporary  $4\frac{1}{2}$ -inch walls; *m*, space given each plant after occupying *k* with roots; *n*, roots in full space; *o*, corner for standing young plants.

fruit. The top 3 inches of old pasture-soil, moderately strong yellow loam, stacked in autumn in narrow piles, with a 1-inch layer of fresh horse-droppings spread on each tier of turves, and a similar thickness of old mortar rubbish, will form a good mixture. Chop up when wanted into 2 or 3-inch squares, adding a quart of steamed bone-meal,



another of soot, and half a peck of wood-ashes to every 3 bushels of compost, thoroughly incorporating the whole.

*Culture in Pots and Tubs.*—Commencing with a sucker in a small pot in late February or early in March, shift it into an 8 or 9-inch pot, drained well, and pot rather lightly. Give water sparingly till the roots reach the sides of the pot, then copiously. Keep the plants in a stove temperature, and in the same pot for six to eight weeks, then transfer to the fruiting-pot or tub. This should not be less than 2 feet, and is better 3 feet in diameter at the top, not less than 2 feet deep, with four or five holes, 1 inch in diameter, for drainage. Place the pot on four bricks clear of the apertures. Cover each opening with a large crock or oyster-shell, add more large pieces of pot to the depth of  $4\frac{1}{2}$  inches, then add  $1\frac{1}{2}$  inch of smaller crocks, all quite clean. Oyster shells form excellent drainage. Place a layer of the rougher parts of the compost on the drainage, introduce more, and press it moderately firm to the right level. The plant should be so disposed that its upper roots will be covered with an inch of soil, leaving 3 inches of space below the rim of the pot for water. If the soil be rather dry, as it ought, afford a good watering at once, and repeat only when needed. The plant will grow apace, and soon fill the pot with roots. Then supply liquid manure twice a week, say 4 gallons each time, and the same quantity of water in the week. In hot weather liquid will be required every day, less frequently in dull weather. By September a plant, say of *M. Cavendishi*, 8 to 10 feet high, should be produced, and by keeping it dry for two or three weeks, it may throw out its flower spike. If so, and before the first row of fruit is half developed, the watering and feeding must be resumed, also a rich top-dressing afforded, and a varied stimulant given occasionally. By Christmas the bunch of fruit will be well developed, and the pods commence ripening in March; then keep the plant rather dry at the roots and avoid wetting the fruit. Thus bananas may be fruited in twelve months.

A plant that has made a good growth in the preceding year, and rested during the winter, should have the soil picked out from amongst the roots in February, and fresh compost supplied, which will soon be occupied by greedy roots. Encourage these by surface dressings, and sustain growth with stimulating liquids. In June the plant thickens at the upper part of the stem, and when the spike bursts forth, water must be kept from it. Directly the fruit is set, supply water abundantly and feed generously. The fruit will ripen towards the end of summer.

*Beds for Planting.*—These afford the largest clusters and the finest fruits. The bed



cannot be over-drained, therefore provide 3-inch pipes to carry off surplus water, and place over them 1 foot in depth of rubble, which cover with a 3-inch layer of clean gravel or old mortar rubbish, and a layer of turves. The depth of soil may be 2 feet or more, but a large quantity to begin with is objectionable. Narrow beds, extending the area as the roots spread, are best, for the plants revel in sweet, friable compost, and like it fresh. Always afford fresh soil, removing every particle of the old, for young plants. If care be taken in clearing out old beds, the drainage will remain effective indefinitely.

*Planting.*—Old, stunted, starved plants are worthless. Healthy plants, 2 to 3 feet high, with good leaves, only are suitable, and they should be sturdy and well rooted. The middle of February is a good time to put out young plants, also to renew the soil amongst the roots of plants in pots, tubs, or narrow borders. Planting is often delayed until March or April through the backwardness of the suckers, and plants can be put out whenever vacancies occur for maintaining a succession of fruit throughout the year.

*Feeding.*—Indulgence in stimulants to the extent of inducing grossness is not advisable, yet plants in pots and tubs must be encouraged to develop and store in the growth abundant matter for the formation of fine clusters; therefore supply liquid manure to plants having filled the allotted area with roots, and, after the fruit is set, it can hardly be given too copiously. Weak and clear liquids only should be used, say, guano, 1 pound, to 20 gallons of water; soot, 1 peck, to 100 gallons of water; fresh cow-dung, 1 peck, to 20 gallons of water; and sheep-droppings, 1 peck, to 30 gallons of water; place each ingredient in a sack, and immerse it in a barrel of water, using the liquid clear. Stable and cow-house drainings diluted when pure with six times the bulk of water are excellent. Sulphate of ammonia and nitrates of potash and soda may be supplied at the rate of  $\frac{1}{4}$  ounce per gallon of water. All the stimulants named, but only one at a time, may be used at every alternate watering, except the last three, when once a week will suffice. When the fruits are ripening, clear water only should be used.

*Surface Dressings.*—The banana, being a gross feeder, delights in a rich mulch. Plants in pots and tubs need top-dressing when they fill them with roots, repeating it at monthly intervals. Between each dressing apply fish manure; or superphosphate, 3 parts, nitrate of potash, 1 part, at the rate of 2 ounces per square yard, affording a good watering after the dressing. Plants in boarders may not need fresh soil till the fruit is set, then afford them a dressing, and renew as the roots protrude. One bushel of turfy



loam, 1 peck of horse-droppings,  $\frac{1}{2}$  peck of wood ashes, and a small handful of common salt, mixed, make an excellent surface-dressing for bananas.

*Moisture.*—The banana luxuriates in a genial atmosphere, and suffers from checks. Syringe the plants every afternoon during the growing season, and damp the walls, floors, and beds, when they become dry from February to September, inclusive, using clear liquid manure occasionally in the evening. Sufficient moisture is afforded during the winter months by damping in the morning and early afternoon, but action must be guided by the weather, and in very severe weather moisture should be withheld. When the plant thickens in the centre syringing must cease, for water entering the "heart" causes the young fruit to decay.

*Temperature.*—A long season of growth is important. The growing period should commence in mid-February, with 60° to 65° at night, 70° to 75° by day artificially, keeping through the day at 80° to 85° from sun heat, closing early so as to raise the heat to 90° or more on fine afternoons. From May to September 65° at night should be the minimum, 70° to 75° on dull days; 80° to 85° or 90° with sun heat and ventilation, closing early with plenty of moisture so as to increase to 90° or 100°. From September to mid-February the temperature may be 60° to 65° at night in mild weather, 5° less in severe weather, and 70° to 75° by day when mild or a little sun prevails. The temperatures named suit *M. Cavendishi*, but *M. sapientum* varieties require 5° to 10° more heat.

*Ventilation.*—Effect a change of atmosphere on every favourable opportunity; in winter by admitting a little air between 70° and 75°, without lowering the temperature, closing at 75°; in summer by ventilating in the morning slightly, between 70° and 75°, freely between 80° and 85°. Close early; in spring, soon after midday, in summer about 4 P.M., or earlier, according to the weather. A chink of air at night allows the pent-up moisture to escape, also prevents drip and the deposition of moisture on the foliage in the early part of the day, which is prolific of scorching.

*Fruiting and Perfecting.*—When the bunch of fruit appears, let it be exposed to the sun by drawing the leaves aside, and, when the plants are at a good distance from the glass, it may be necessary to remove some of the leaves. When the fruit is set and fairly swelling, the barren end may be cut off to assist the growth, and it is said to prevent an excess of alkali in the fruits. In the West Indies the barren end is cut off when the cluster is gathered, and taken into the house to ripen. This practice of cutting in advance of ripening is not advisable here, as the richest-flavoured fruits are those



which ripen on plants kept rather dry at the roots in a warm, freely-ventilated house.

The whole bunch may, however, be cut off just where the upper tier of fruits are ripening, and if it be suspended in a dry, airy room, with a temperature of 50°, the fruit will ripen and afford a supply two months or more after it is cut. The banana is a type of health, nothing short of neglect in cleanliness causing it to be infested with parasites.



## BERBERRIES.

THE Common Berberry, *Berberis vulgaris*, is a deciduous shrub, growing 8 feet or more high, and, though originally a native of Eastern countries, is generally diffused in Europe, and found wild in some parts of England. It is planted in shrubberies for ornament, or cultivated for its fruit. The fruits are oblong-shaped, produced in small bunches, and ripen early in autumn, when they are a beautiful red colour, as shown in the vignette in Vol. I. Birds refuse to eat the fruit before it is thoroughly ripe. It possesses an agreeable acid flavour, is cooling, and thirst quenching. When boiled with sugar it makes a pleasing preserve, rob, or jelly. Berberries are also used as a dry sweetmeat, and in sugar plums or comfits. In a green state the berries are pickled with vinegar.

There are several varieties of the Common Berberry, named after the colour of the fruit, namely:—Large red, violet, purple, black, yellow, and white. These varieties are employed for garnishing dishes, as well as for the purposes before mentioned. The Stoneless Berberry is a form of the Common Berberry, the fruit without seeds. This characteristic, however, is not assumed till the shrub becomes aged, and suckers taken from the Stoneless Berberry produce fruit containing seeds whilst young; therefore, it should be propagated by layers of the parts that produce seedless berries.

Propagation is effected by seeds, suckers, and layers. Seeds may be sown in the autumn fresh from the ripe berries, in light soil; they will germinate the following spring, and the seedlings should be transplanted in the autumn. Suckers should be detached with good roots, and planted in the autumn. Layering, however, after the leaves fall, is the best mode of increase. The layers must be of young ripe shoots, notched, or tongued at a joint on the part inserted in the soil. All the buds, except two or three on the part above ground, must be removed, and the layers should remain two years before they are detached from the parent.

Berberries bear profusely in light and rather dry soils, but the finest fruit is produced by bushes growing in good loam mingled with flints, and resting on chalk.



Open situations are essential to the production of fine high-coloured fruit. The bushes may be planted in rows 7 feet 6 inches apart, more rather than less on good soils. Pruning must be limited to shortening irregular growths so as to insure a well-furnished base, not crowded, but open to the centre of the bush. Every bush should be grown on one clear stem, removing all suckers as they appear. The roots should not be mutilated by digging about the bushes, and liquid manure may be supplied if the growth is not free and fine fruits are desired. This is preferable to planting in rich soil and starving the bushes after they commence bearing.

Berberries are liable to the attacks of a fungus, *Æcidium berberidis*, believed to be a stage in the development of *Puccinia graminis*, which proves destructive to the wheat crops. The *Æcidium* injures the berberry, and is incurable without also destroying the infested structures. It should be prevented spreading by removing the infested leaves and burning them; but the better plan is to destroy the spores before or when germinating. See "Gooseberry Fungus."



## BILBERRIES AND CRANBERRIES.

**BILBERRIES** are the fruit of "*Vaccinium Myrtillus*—bilberry, bleaberry, blueberry, common whortleberry. Flowers solitary, on naked pedicels,  $\frac{1}{4}$  inch long; corolla rosy, tinged with green, globose,  $\frac{1}{4}$  inch in diameter. Fruit dark blue,  $\frac{1}{3}$  inch in diameter, glaucous. Leaves ovate,  $\frac{1}{2}$  to 1 inch long, serrated, reticulate nerved, rosy when young. Stems many, erect, 6 inches to 2 feet high. Europe (Britain), Asia and America" (Nicholson).

The bilberry is very generally diffused over the northern countries, growing abundantly on the moors of England and Scotland. It is also plentiful in Ireland, and produces berries the size of currants, of a bluish-black colour, covered with a mealy

bloom, ripening in October. They are eaten either raw or in tarts with cream, or made into jellies with sugar. In Devonshire they are eaten with clotted cream, and in the northern and western counties of England and Scotland they are made into pies or puddings.



Fig. 36. BILBERRY AND PEAR-SHAPED CRANBERRY. FRUIT  
HALF NATURAL SIZE.

*Bluets*, the large globose blackish berries produced by *V. pennsylvanicum*

*angustifolium* (narrow-leaved), "are highly esteemed by the inhabitants of the northern parts of America, where the plant is indigenous. In Siberia the berries are macerated during the autumn and part of the winter in water, and afterwards they are eaten in a raw state, and fermented along with barley or rye, and a spirit distilled from them; or with honey, and a wine produced. Sweetmeats are also made of them with honey or sugar, which are much used in Russia at balls and masquerades" (Smith). Bilberries require similar treatment to that described for cranberries.

**CRANBERRIES** are small red fruits produced by slender, wiry, trailing-stemmed, small-leaved shrubs growing in boggy heaths and marshy grounds in Russia, Sweden, the north of England, Germany, and in North America. They are abundant in the



United States, Canada, Newfoundland, and the northern parts of Russia. These fruits are collected in America by means of a rake, in Germany by wooden combs, but many are picked by hand, as in England, where they grow but scantily. They are packed in kegs and barrels containing from 8 to 20 gallons each for export to other countries. England imports about 50,000 gallons annually. The berries have a sharp, agreeable, acid taste, and are highly grateful to most persons when made into tarts, jelly, or other preparations with sugar, much of which is required to correct the natural tartness of the berries; and they are preserved dry in bottles, corked so as to exclude air; but some persons fill up the bottles with clear spring water, in which they keep fresh a long time. The cranberry is cultivated in some gardens in this country for its fruit. There are two species only, but several varietal forms.

*American Cranberry* (*Oxycoccus macrocarpus*).—Flowers pink, on erect, proliferous branches; fruit slightly oval, bright red, twice the size of currants, without the remains of the calyx at the top of the berry; September; leaves elliptic-oblong, nearly flat and obtuse, glaucous beneath; North America, 1760.

*Common Cranberry* (*O. palustris*).—Flowers pink, with reflexed oblong segments; pedicels terminal, one-flowered; fruit dark red; September; leaves small, ovate, entire, acute, smooth, with revolute margins; Britain.



Fig. 37. CHERRY CRANBERRY. FRUIT HALF NATURAL SIZE.

American cranberries are considered better flavoured than European; some persons, however, do not consider them equal to the Russian cranberries. Of the American three varieties are considered sufficiently distinct to receive names, which indicate the shape of the fruits, namely, the Bell cranberry, Bugle cranberry, and Cherry cranberry.

The European cranberry is also variable, some plants bearing larger fruits than others. One has a dark, another a pale red skin, and some are round, whilst others produce berries decidedly oval in shape, which is evidently the form taken by the cranberry when subjected to cultivation. Plants are readily increased by dividing the roots, the long creeping shoots frequently rooting, and by layers.

Wherever there is a plentiful supply of water, with abundance of peat soil, no difficulty need be experienced in growing cranberries.



A bed or beds are easily formed adjoining a pond, an excavation being made 2 feet deep, and half filled with stones, completing with a layer of fibrous sandy peat. Cranberries do not require constant flooding. From a bed 30 feet in length a sufficient quantity of berries may be procured for the supply of a family throughout the year.

The plants should be put out early in autumn or in spring, 2 feet apart every way. They soon spread and cover the ground. It is an excellent plan to cover the bed with a layer of sand, as these plants produce in proportion to the sturdiness of their growth, and sand solidifies their structure. Weeds must be eradicated, for, though the home of cranberries is amongst grass and other coarse herbage in which the plant manages to hold its own, they are improved by clean culture.

The beds should be submerged about every six weeks during the summer, at shorter intervals if hot and dry, always flooding them about the middle of June to set the fruit. Naturally cranberry plants are often submerged in winter, but we have not found any advantage in the plan, as practised in the United States, of flooding during the winter, and draining the water off in the spring. Picking commences in October. Frost softens the cranberry, and gradually deprives it of its peculiar flavour; still, in mild seasons it remains excellent up to January.



## BLACKBERRIES.

COUNTRY lanes and fields in September reveal the blackberry or bramble in all its rich abundance—a truly marvellous crop of fruit, bushels upon bushels in the parishes, tons upon tons in the counties. Vast quantities are gathered, and vastly more fruit wasted. Nevertheless, blackberries are esteemed by rich and poor for their good qualities, either raw or cooked, in pies and puddings, or preserved, the jam being wholesome and of a very rich flavour. They also furnish an excellent home-made wine. So long as blackberries can be had for the gathering, little stimulus will be given to cultivation, but they do not grow wild everywhere, and, besides, the best varieties well grown in gardens are, both in size and quality, far superior to hedgerow fruit.

### SPECIES AND VARIETIES.

The blackberries suitable for cultivation have originated from three species—1, *Rubus fruticosus*, the common bramble, a native of Britain; 2, *R. laciniatus*, or Cut-leaved bramble, a desirable species long established in this country; 3, *R. villosus*, a native of North America.

There are many sub-species of *R. fruticosus*, of which may be mentioned *R. f. cœsius*, the Blue bramble, or Dewberry; *R. f. corylifolius*, the Hazel-leaved bramble; and *R. f. suberectus*, the Red-fruited blackberry, which differ from the type as their names indicate, but they are rarely grown for utilitarian purposes, nor are many others, which do not call for enumeration here. There is, however, one variation from the type, though not recognised as a distinct variety by botanists, that merits the attention of cultivators. It is found in various parts of the country, notably in Hertfordshire and Warwickshire, and differs from the majority in producing fewer canes from the root stem. These grow semi-erect to a height of about 4 feet, then arch over to the ground, and extend to a length of 10 feet or more. The canes produce long side-growths or laterals the second year, and bear large, purplish-black, shining, and richly-flavoured fruits. When reference is made in the gardening press to the improvement effected by cultivation in the common blackberry, the experience is probably founded on what may be popularly termed the Warwickshire variety.



The Parsley-leaved bramble is said to be a "chance (English) seedling" from *Rubus laciniatus*, which it somewhat resembles, but it is far more useful, and perhaps the most serviceable of all blackberries grown in this country.

American varieties are very numerous, and some of them very fine, but as a rule they not only require soil of the best quality, but also warm positions for their satisfactory production in the United Kingdom. It is only necessary to direct attention to a few varieties that appear the best suited to our climate, namely, Early Harvest, Kittatinny, Lawton, Mammoth, and Wilson Junior. Some of these are more robust in habit than others, but all bear large, black, juicy, and well-flavoured fruit.

Of the varieties named, the Warwickshire succeeds in open or exposed places; Early Harvest, Lawton, and the Parsley-leaved like sheltered positions. Wilson Junior and Kittatinny require warm situations in gardens. For covering arches over walks, trellises, fences, or unsightly walls, the Parsley-leaved may be chosen, and in warm situations the Mammoth, though it is generally less reliable.

Mr. W. K. Woodcock, a successful grower of blackberries in a garden near Sheffield, has described his experience with the Parsley-leaved variety. Writing in October he says:—"Since the first gathering commenced six weeks ago, more than 2 bushels of fruit have been obtained from a row 22 yards long, and employed in a variety of ways for pastry, also for making jam, jellies, cheese and syrup. There is an average of 50 fruits to each spray or lateral, and 40 laterals to each cane of 12 feet in length, and as we grow an average of four canes from each root we have from one plant 8,000 fruits, nearly all as large as the finest raspberries; and coming in as they do after all other bush fruits are over, they are highly esteemed. The roots were planted 5 feet apart, and the canes are trained more or less horizontally over a row of stout stakes 9 feet high and 2 feet 6 inches apart." An accurate representation of a fruiting branchlet is given in the engraving, Fig. 38.

#### CULTURAL ROUTINE.

*Propagation.*—Though blackberries may be raised from seed, cuttings of the roots, also of half-ripe shoots, as well as by suckers, these are not desirable modes of increase, and much the best method is layering the points of the canes in August or September as follows:—As soon as the tips grow nearly bare of leaves and become dark in colour, peg them into the ground 3 or 4 inches deep at an angle of about 45°. In a month to six weeks they will form bushy roots, and can be cut off, planting where required.



To obtain strong plants stop a strong young growth when 2 feet high ; this will cause it to throw out several laterals, and if the points of these be layered early, they become well rooted by the autumn.

*Situation.*—Blackberries require open and sunny sites, but sheltered from cutting



Fig. 38. PARSLEY-LEAVED BRAMBLE.

winds. In bleak places the bushes are stunted, yet produce astounding crops of small fruits ; in shaded spots they grow vigorously, but produce little fruit. Eastern aspects suit the British varieties ; the American sorts succeed best on south or west



exposures. The wild blackberry thrives in waste places, woodlands, lanes, fields, parks, shrubberies, orchards, and gardens.

*Soil.*—Cold wet clay, pure dry sand, a mere crust of soil on chalk, a thin layer of peat on a hard wet pan, or a bog will not grow blackberries profitably, but deeply worked fertile soil, including moorlands, produce enormous crops. Stagnant water is their greatest bane; they like moisture, but it must drain freely away from the rootstocks. A tolerably strong soil affords the finest fruits. The ground in all cases must be deeply stirred, and if at all poor, liberally manured, adding opening material to heavy ground. In the latter and shallow soils it is a good plan to form ridges of prepared soil at the distances the rows are to be apart, with the ends north and south.

*Planting.*—Autumn is the best time, and the smaller and younger the plants, provided they are well rooted, the better they will grow. Transplant carefully; exposure of the roots and delay in transit cause a large percentage of failures. Spring planting may be practised, watering in dry weather and mulching over the roots.

1. The medium growers, such as Kittatinny, may be planted 3 feet apart, in rows 5 feet asunder. 2. Strong growers, like Early Harvest, 6 feet between the rows, and 4 feet from plant to plant. 3. Trailers, such as Parsley-leaved, rows 9 feet apart, plants  $4\frac{1}{2}$  feet asunder. Those distances are for plants trained to trellises; if grown in bush form the plants must be set at the distance named for the rows every way. 4. Walls: if 6 feet, plant each section at the distance advised between the rows; if 10 feet or more high, the Parsley-leaved only is suitable, and should be placed  $4\frac{1}{2}$  feet apart. 5. Espalier arches spanning walks:—Parsley-leaved  $4\frac{1}{2}$  feet apart.

*Trellises.*—1. Ordinary raspberry espaliers answer: 4 feet high for the small, 5 feet for the moderate, and 6 feet high for strong-growing varieties. 2. Wood trellises are easily formed of stout poles thrust into the ground and crossed diagonally, nailing them together at the top crossing, and cutting the top level at 6 feet high. This covered with Parsley-leaved blackberry forms a useful break between the ornamental and vegetable parts of small gardens. 3. Procure sound oak posts and fix them in the ground one at each end of the row. Drive a stout stake into the ground at every 12 feet between the posts, brace the posts, strain a No. 6 galvanised-iron wire from one post to the other, near the top, and secure the wire to the stakes at the same height with small staples. This simple trellis is not more costly than staking each plant, and lasts as long as the plants.

*Training.*—Cut the plants off level with the ground at planting. Allow the young



growths to extend till June ; then make choice of one or two of the strongest, and cut the other away. This will give stout canes for fruiting the following year, but if they are weak, as they sometimes are the first season, cut them off level with the ground in the autumn. If the canes are making good progress the first year, shorten them in autumn to 4 or 6 feet, as the varieties are moderate or strong, and securing the canes to stakes or a trellis.

The following year cut away the new canes to three or four of the strongest, and pinch the points off these when 5 to 7 feet long, according to variety ; also pinch off the ends of the laterals at the third or fourth joint. After the fruit is gathered, cut out the canes which have borne it level with the ground. This leaves those of the current year's growth for bearing. Shorten the canes as before advised, and the laterals to a bud or two of their base, but, if not unduly long, and the buds are plump, leave them entire, and secure to the stakes or trellis, dividing the distance equally between the canes. The training in subsequent years is a repetition of the preceding, remembering that five canes is the maximum number to leave on each stool each year. Wall and arch plants are pruned and trained similarly to those on trellises.

*Bush Training.*—Cut a newly-planted cane to near the ground in autumn or early spring. Let the growths extend the first year, and cut them all away in autumn, mulching over the stools. The following year select two or three of the strongest canes, cutting away the rest. Pinch off the points of the canes when 2 to 4 feet high, as the varieties are dwarf or tall-growing, and pinch off the ends of the laterals at about 12 inches from the main stem. This method gives stout canes with plenty of short side-branches, well supplied with buds for bearing the following year. These canes are cut off even with the ground after fruiting, four to six young canes having been provided to supplant them in bearing in the succeeding year.

Though this systematic method of summer pruning is advocated by careful growers in warm situations, it is not generally practised in large cultures, the plants being treated on a simpler plan. This consists in thinning the suckers to four to six on each plant, and merely slashing off the ends of the young canes in August, or when they overtop the bearing canes or otherwise interfere with cultivation. The canes bearing fruit during the summer are cut off even with the ground in autumn with long-handled pruning shears or a hooked knife with a long handle, and any straggling canes are shortened, also the laterals a little with a hook.

*Manuring.*—The blackberry likes good fare. Apply a good coating of decayed



stable or farmyard manure all over the ground and between the canes as soon as the plantation is trimmed or cleaned up in the autumn, leaving it on the surface for a few weeks; then dig it in lightly between the rows with a fork, pointing it in a foot or more next the plants very lightly and carefully. Two barrow-loads per rod, or sixteen cartloads per acre, is a proper dressing of manure, or rich compost. The débris of the rubbish heap properly sweetened, and some lime mixed with it, is relished by blackberries. Bone-meal, 3 cwt.; kainit,  $1\frac{1}{2}$  cwt., mixed, per acre (or 3 pounds per rod), may be applied in autumn, and if more vigour is needed supply nitrate of soda, 1 pound per rod, or  $1\frac{1}{2}$  cwt. per acre, early in June.

*Liquid Manure.*—The contents of cesspools and manure-tanks, also house-slops, assist plants in poor soils to swell their crops, pouring it between the rows during growth, and also over the whole space in winter, for enriching the soil. Plants growing in dry situations, as against walls, are benefited by soakings of water once a week in dry periods. These aids cannot always be given; therefore a mulch of any coarse manure, applied before flowering, keeps the ground moist, affords some nourishment to the current crop, and enriches the soil for the succeeding by supplying humus, in which blackberries delight. Weeds must be kept under, for the cleaner the plantation the more productive it will be.

*Durability of Plantations.*—Blackberry plants liberally treated afford considerable fruit in the third year, continuing to bear abundantly eight to ten years or longer, much depending on soil and treatment, and then the old stools become weak, the shoots thin, and the fruit small. The land is then the better for a change, new plantations having been made in anticipation of cutting out the old plants.

*Growing under Glass.*—Wilson Junior plants grown in 12-inch pots a year or two outdoors, in a warm situation, so as to become strong, succeed admirably placed in an orchard-house in spring; or the plants may be kept outside until August, and then placed under glass to ripen their fruit, which, so grown, is remarkably fine and luscious, esteemed at dessert, and much relished with cream. The plants require top-dressings of rich material, and feeding with liquid manure, not allowing them to lack water. In winter the plants may be placed outdoors, plunging the pots in ashes.

*Enemies.*—Birds are fonder of cultivated than wild blackberries, and where blackbirds and thrushes abound, their depredations must be prevented by nets or a gun. The plants are seldom affected by blight or disease.



## THE CAPE GOOSEBERRY.

**T**HIS is the fruit of *Physalis peruviana* (pubescens), a native of South America, and introduced into this country in 1772. There are two distinct forms of the type cultivated for their berries.

*P. P. EDULIS*.—Flowers whitish, with violet anthers ; fruit yellow, globose, included in the inflated calyx (bladder-like) ; flesh resembling a gooseberry, possessing a sweet, acidulous juice ; leaves almost entire ; sub-scandent.

*P. P. VIOLACEA*.—Flowers yellow, fruit dark violet, large, globose ; leaves cordate ; height 3 feet. Mexico, 1883. This is only a cultivated form of the type, with larger and higher-coloured fruits, very decorative for dessert.

The yellow-fruited Cape Gooseberry (*P. p. edulis*) is the most cultivated in gardens, and its sweet, acidulous berries, which resemble cherries, are esteemed by some palates ; they have a pleasing appearance and flavour when candied, and in that form are used at dessert.

Plants are easily raised from seed sown in light, sandy loam in spring, in gentle heat. They should be potted singly when the second leaves appear, and grown near the glass to keep them sturdy. When established in the small pots the plants should be removed to the greenhouse, and



Fig. 39. CAPE GOOSEBERRY (*PHYSALIS PERUVIANA EDULIS*), IN  
FLOWER AND FRUIT.

1, Fruit half natural size ; 2, inflated calyx—part removed.

be shifted into 5- and 7-inch pots respectively as they fill those they are in with roots. When about a foot high give them their final shift into pots 9 inches in diameter, using a compost of light, fibrous loam and one-third leaf soil, or well-decayed manure, and a sixth of sand, potting firmly. Place the plants where they can be trained to a wall or trellis, or to sticks 5 or 6 feet long. Five sticks



in a 9-inch pot will be sufficient. The plants ought to have their points pinched out when they are a foot high, and will need to be stopped until sufficient shoots are produced for training. The further treatment consists in stopping any shoots that grow too rampant. When the plants have made a foot of growth, if they do not show fruit stop them, and subsequently as required, but after they commence blooming it will not be necessary to stop the growths. Cut out unfruitful or exhausted shoots and train in others for bearing, but avoid overcrowding. Water must be given whenever required, allowing the soil to become fairly dry before watering, then afford a thorough supply, with liquid manure occasionally. They are sometimes planted out, but are then apt to grow too rampantly, and are as a rule better grown in pots, which may be plunged over the rims in the border.

The fruit usually ripens at the end of summer and in autumn, but the crop comes in successionally, and fruit can be had almost throughout the year. Young plants kept over the winter in 5- or 6-inch pots, and shifted into their fruiting pots early in spring, blossom and fruit early in the summer and continuously.

Red spider often infests the plants; for remedies see Vol. I., pages 269-272. The worst pest, however, to the Cape Gooseberry is the white fly, which may be similarly combated; and aphides may be destroyed by methods described on pages 257-260 of the same volume.



## CHERRIES.

THE cherry is said to have been sent to Rome from Cerasus in Pontus (Armenia) by Lucullus, when engaged in the war against Mithridates, B.C. 74—66. Pliny says the cherry was introduced into Britain A.D. 46. Lydgate's London Lack-penny poem mentions "cherries in the ryse," or in twigs, hawked about the streets of London in 1415. Cultivated sorts, however, are alleged to have been first introduced into this country about the time of Henry VIII. by Harris, from Italy, Flanders, and other countries, and originally planted at Sittingbourne, in Kent. Nevertheless, cherries were probably cultivated at a much earlier period. They are enumerated in a list of fruits of Henry VII., and Dr. Bulleyer, who was born early in the reign of Henry VIII., says we had excellent cherries (among other fruits) before they were introduced from Holland and France; and Parkinson, who wrote in 1629, mentions thirty-six varieties as then in cultivation. Passing to the present day, we find upwards of one hundred and twenty varieties described in the last edition of the *Fruit Manual*. A large collection is grown in the royal gardens, Frogmore, for the cherry is the favourite fruit of Her Majesty Queen Victoria, and a supply of ripe fruits is maintained for the royal table from the beginning of April till the close of summer.

"The fruit of the cherry is held in high estimation wherever it is cultivated, either to be eaten raw, or to be cooked in pies or puddings; sometimes cherries are steeped in brandy and called brandy cherries. The juice of the fruit is mixed with brandy, and called cherry brandy. The celebrated Kirschwasser of Germany is a liqueur distilled from the fruit of the cherry, and is thus made:—When the cherries have arrived at maturity, they are gathered, and the stalks separated from them. They are then pounded in a wooden vessel, without breaking the stones, and left till they ferment. When fermentation has begun, the liquor is stirred two or three times a day, and as soon as the fermentation has ceased, it is put into close barrels to prevent the acetous fermentation. The kernels are then broken and thrown into the liquor, and the whole is distilled together. Maraschino is an Italian liqueur, made at Zara, in Dalmatia, from a small black gean, which is fermented with honey, afterwards with the leaves



and kernels of the fruits ; then distilled, and sweetened with sugar. The gum of the cherry was long considered somewhat analogous to gum arabic ; but it has been ascertained that, while the principle of gum arabic is arabin, that of cherry gum is cerasin, and unlike arabin, is not soluble in cold water. The shade trees of Germany are chiefly cherry-trees. . . . The wood of the wild cherry is firm, strong, close-grained, and of a reddish colour. It is soft, easily worked, and takes a fine polish ; is much sought after by cabinet-makers, more particularly in France, where mahogany is much less common than in Britain.”—Hogg’s *Vegetable Kingdom*.

#### VARIETIES.

“All the varieties of cultivated cherries consist of eight races,” states the same author, in his *Fruit Manual*, to which those desiring further information, as regards synopsis and scientific description, are referred ; but for cultural purposes cherries are generally, and by the same eminent authority, divided into two classes, namely :—“1. Geans : branches rigid and spreading, forming round-headed trees ; leaves long, waved on the margin, thin and flaccid, and feebly supported on the footstalks ; flowers large, and opening loosely, with thin, flimsy, obovate or roundish-ovate petals ; fruit heart-shaped, or nearly so ; juice sweet. 2. Griottes : branches either upright, spreading, or more or less long, slender, and drooping ; leaves flat, dark green, glabrous underneath, and borne stiffly on the leaf-stalks ; large and broad in Dukes, and small and narrow in Morellos ; flowers in pedunculate umbels, cup-shaped, with firm, stiff, and crumpled orbicular petals ; fruit round or oblate, sometimes, as in the Morello, inclining to heart-shaped ; juice sub-acid or acid.”

#### DESCRIPTIVE SELECTION OF CHERRIES.

GEANS.—Fruit obtuse, heart-shaped ; flesh tender and melting. *Black Geans*.—Flesh dark ; juice coloured.

BLACK EAGLE.—Fruit medium to large, borne in clusters of two and three, in large bunches on the spurs ; roundish heart-shaped ; skin deep purple, black when highly ripened ; flesh rich, sweet, delicious ; ripe beginning of July ; tree very free sturdy grower, hardy, and great bearer ; fine for garden, wall, and orchard.

EARLY PURPLE GEAN.—Fruit large, obtuse, heart-shaped ; skin shining dark purple, almost black ; flesh very juicy, sweet, and rich, pleasant flavour ; ripe early in June ; tree vigorous, but tender, excellent bearer ; requires a south wall ; suc-

ceeds as a bush in warm situations only ; one of the earliest good cherries, but too tender for orchards.

EARLY RIVERS.—Fruit large, nearly 1 inch in diameter, heart-shaped, borne in clusters of ten or twelve, two to four being in one peduncle ; skin shining deep black ; flesh very juicy, sweet, and richly flavoured ; ripe middle to end of June ; tree vigorous, healthy, hardy, and abundant bearer ; the finest early cherry, very handsome ; excellent for forcing ; walls, garden, and orchard ; promises to be a profitable variety for market.



GUIGNE D'ANNONAY.—Fruit large, obtuse, heart-shaped ; skin purplish black ; flesh juicy, sweet, and pleasantly flavoured ; ripe early in June ; tree vigorous, but tender, excellent bearer ; one of the earliest good cherries ; fine for south wall, and in an unheated house ripens the first week in June, in hot seasons the last week in May.

WATERLOO.—Fruit large, obtuse, heart-shaped ; skin dark purple, mixed with brownish red, covered with minute pale dots, black when fully ripe ; flesh rich and delicious ; ripe end of June and

beginning of July ; tree a free grower, good bearer in Kent, moderate bearer in some localities ; succeeds against a wall, as a bush, or standard ; the fruit stands wet well.

WERDER'S EARLY BLACK.—Fruit very large, obtuse, heart-shaped ; skin deep shining black ; flesh very juicy, sweet, and rich ; ripe end of June ; tree strong and vigorous, free and constant bearer ; suitable for garden or orchard, and deserves extensive cultivation.

*Red Geans*.—Flesh pale ; juice uncoloured.

BELLE D'ORLEANS.—Fruit medium-sized to large, roundish, somewhat heart-shaped ; skin yellowish white, pale red on sun side ; flesh juicy and richly flavoured ; ripe middle of June ; tree good grower, but tender, free bearer ; excellent for forcing, cool house, south wall, also garden and orchard in warm situations only.

EARLY JABOULAY ; syn. : EARLY LYONS.—Fruit large, obtuse, heart-shaped ; skin light red ; flesh juicy, coloured, rich, and delicious ; ripe end of June ; tree vigorous, but tender ; good for forcing, cool house, and wall.

FROGMORE EARLY.—Fruit large, obtuse, heart-shaped ; skin pale yellow, marbled with red ; flesh very juicy, sweet, and rich ; ripe early in July ; tree free-growing, healthy, and abundant bearer ; suitable for wall and garden ; a very fine cherry.

GUIGNE DE WINKLER.—Fruit large, roundish, somewhat heart-shaped ; skin bright red ; flesh very juicy, sweet, pleasantly flavoured ; ripe September, hanging on tree until October ; tree vigorous, good bearer ; good for cool house, or wall, and valuable for its lateness.

HEARTS.—Fruit heart-shaped ; flesh half tender, firm, or crackling. *Black Hearts or Bigarreaus*.—Flesh dark ; juice coloured.

BEDFORD PROLIFIC.—Fruit large ; like Black Tartarian, but the tree is hardier ; ripe beginning of July ; tree free grower and abundant bearer.

BIGARREAU NOIR DE GUEBEN.—Fruit very large, roundish ; skin jet black, lustrous ; flesh firm, juicy, rich, and delicious ; stone small ; ripe early in July and hangs long on the tree ; tree an abundant bearer, and valuable for garden or orchard ; a fine cherry of German origin.

BIGARREAU DE SCHREKEN.—Fruit large, roundish ; skin jet black, shining ; flesh rather firm, juicy, rich, and delicious ; ripe middle to end of June ; a very fine early Bigarreau ; fine for cool house and south wall.

BLACK TARTARIAN.—Fruit very large ; skin shining, blackish brown, black when fully ripe ; flesh rather tender than firm, juicy, and richly flavoured ; ripe end of June and beginning of July ; tree vigorous, upright, free grower, spreading with age, rather tender, and abundant bearer ; good for forcing, fine for wall, succeeds in warm situations only as a standard.

BOHEMIAN BLACK BIGARREAU.—Fruit very large, roundish ; skin shining, jet black ; flesh firm, but not crackling, juicy, rich, and delicious ; ripe end of June ; tree vigorous, free bearer ; cool house or wall.

BÜTTNER'S BLACK HEART.—Fruit large ; skin deep black on one side, purplish black on the other ; flesh half tender, juicy, and pleasantly flavoured ; ripe middle of July ; tree strong, upright grower, very hardy, excellent bearer ; orchard.

TRADESCANT'S HEART ; syn. : LATE BLACK BIGARREAU.—Fruit very large ; skin dark red, changing to blackish purple or black ; flesh firm, juicy, and rich, adhering to the stone ; ripe end of July, or beginning of August, hanging late ; tree vigorous, but tender ; one of the finest cherries for walls.

TURKEY BLACK HEART.—Fruit large ; skin black ; flesh firm, juicy, and good ; ripe August ; tree vigorous, making a large specimen ; a popular cherry in Kentish orchards ; valuable for high walls.



*Red Hearts or Bigarreus.*—Flesh pale ; juice uncoloured.

**BIGARREAU.**—Fruit very large ; skin pale yellow marbled with red ; flesh very firm, crackling, and juicy, sweet, and delicious flavour ; ripe middle to end of July ; tree very strong grower, hardy, and abundant bearer ; fine for high walls ; excellent for orchards.

**BIGARREAU DE MEZEL.**—Fruit very large ; skin shining, pale rose with red, dark purple, streaked on sun side when ripe ; flesh red, firm, juicy, and richly flavoured ; ripe middle to end of July ; tree very vigorous, hardy, and productive ; fine for high walls.

**BIGARREAU NAPOLEON.**—Fruit very large ; skin pale yellow, mottled with red, and beautiful red cheek when ripe ; flesh very firm, juicy, rich, and aromatic ; ripe beginning of August ; tree very vigorous, hardy, great bearer ; suitable for high walls, orchards, forming a handsome standard.

**EARLY RED BIGARREAU.**—Fruit large ; skin bright red, transparent ; flesh firm, sweet, rich, and delicious ; ripe middle to end of June ; tree sturdy free grower, semi-erect habit, free bearer ; fine for wall and cool house.

**ELTON.**—Fruit very large, handsome ; skin pale waxen yellow on the shaded side, mottled and dotted with bright red on sun side ; flesh more tender than firm, juicy, sweet, very rich and excellent ; ripe beginning to middle of July ; tree strong, vigorous grower, habit semi-pendulous, excellent bearer ; good for forcing, cool house, high wall, or standard in warm localities only.

**GRIOTTES.**—Fruit round or oblate. Flesh tender and melting.

1. *Duke Varieties.*—Leaves large and broad ; branches upright or moderately spreading.

*Black Dukes.*—Flesh dark ; juice coloured.

**ARCHDUKE.**—Fruit large, nearly an inch in diameter, inclining to heart shape ; skin thin, dark red when ripe, becoming almost black if allowed to hang ; flesh very tender, rich, and briskly flavoured ; ripe middle to end of July ; tree vigorous, somewhat pendulous in habit, and prolific.

**DUCHESS DE PALLUAU.**—Fruit very large, 1 inch in diameter ; skin bright red, dark red when fully ripe ; flesh yellowish, tender, juicy, briskly-flavoured ; ripe end of July ; tree robust-growing, free bearer.

**EMPRESS EUGENIE.**—Fruit large, roundish ; skin bright red, dark purplish red when fully ripe ; flesh rather firm, but melting, very juicy, sugary, and refreshing ; ripe end of June ; tree moderately vigorous, very free bearing ; forces well ; good for wall and garden trees, but subject to gum.

**EMPEROR FRANCIS.**—Fruit very large ; skin bright red, very handsome ; flesh firm, very juicy, rich and delicious ; ripe middle of August, hanging into September ; tree vigorous, good bearer ; fine for cool house and wall.

**FLORENCE.**—Fruit very large ; skin smooth, shining, yellow mottled with red, brighter red and dotted with deeper red on sun side ; flesh firm, very juicy, sweet, rich, and delicious, more tender in the flesh than the Bigarreus ; tree moderately vigorous, spreading habit, excellent bearer on well ripened wood ; ripe middle of August, hanging late ; produces splendid fruit against a wall ; fine for cool house ; succeeding in warm soils and localities only as a standard. One of the handsomest and most profitable late cherries.

**GOVERNOR WOOD.**—Fruit large ; skin yellow, washed, and mottled with light bright red ; flesh more tender than firm, juicy, sweet, rich, and delicious ; ripe early in July ; tree vigorous, healthy, and great bearer ; excellent for forcing, and walls ; succeeds as a garden tree, and as standards in all but low level tracts ; one of the best cherries.

**LUDWIG'S BIGARREAU.**—Fruit large, heart-shaped, handsome ; skin shining, bright red, deepest on sun side ; flesh tender and melting, sweet, rich, and delicious ; ripe end of June and beginning of July ; tree vigorous, healthy, and good bearer.

**MAMMOTH.**—Fruit very large, 1½ inch in diameter, obtuse heart shaped ; skin pale yellow, flushed and mottled with red ; flesh rather tender, juicy, and richly flavoured ; ripe middle to end of July.

**MAY DUKE.**—Fruit large, roundish ; skin dark red when fully ripened ; flesh tender, juicy, rich, and pleasantly acid ; ripe beginning to middle of July ; tree sturdy, upright growing, moderately hardy, and free bearer ; excellent for forcing, walls, and garden trees ; one of the most useful, but very liable to gum, and is generally of short duration.

**NOUVELLE ROYALE.**—Fruit large, more so than May Duke ; skin dark red, changing to black ; flesh tender, juicy, briskly flavoured ; ripe end of July ; tree sturdy, compact, and handsome grower.

**ROYAL DUKE.**—Fruit large, handsome ; skin deep shining red ; flesh tender, juicy, and rich, pleasantly flavoured ; ripe middle of July ; tree a sturdy, compact, and excellent bearer.



*Red Dukes.*—Flesh pale ; juice uncoloured.

**BELLE DE CHOISY.**—Fruit large round ; skin amber, mottled with red, transparent ; flesh tender, very juicy, sweet, without acidity ; ripe beginning of July ; tree vigorous, spreading, hardy, moderate bearer ; wall or standard.

**BELLE DE MAGNIFIQUE.**—Fruit very large, handsome ; skin clear bright red ; flesh tender, juicy, and sub-acid ; ripe middle to end of August ; tree semi-erect, forming a handsome pyramid, and bears immensely.

**COE'S LATE CARNATION.**—Fruit medium-sized ; skin dull yellow, clouded and mottled with bright red ; flesh tender, juicy, sub-acid, mellowing by hanging ; ripe middle to end of August, hanging until

September, and useful for variety at desserts ; tree vigorous, healthy, moderate bearer.

**LATE DUKE.**—Fruit large ; skin, shining bright red, darker red when matured ; flesh tender, juicy, sub-acid ; after hanging richly flavoured ; ripe middle to end of August ; valuable through lateness ; tree vigorous, sturdy, forming a fine bush.

**REINE HORTENSE.**—Fruit very large, long, and handsome ; skin very thin, bright red, changing to dark brilliant red by hanging ; flesh very tender, very juicy, sweet, and very agreeably acidulous ; ripe middle to end of July ; tree free, vigorous grower, and bears freely.

2. **MORELLOS.**—Leaves small and narrow ; branches long, slender, and drooping.

*Black Morellos.*—Flesh dark ; juice coloured.

**MORELLO.**—Fruit large, roundish, inclined to heart shape ; skin dark red, becoming black by hanging ; flesh tender, juicy, briskly acid, but after hanging agreeably flavoured ; ripe July and August, but hanging until September ; tree spreading, semi-

pendulous, hardy, and an abundant bearer ; succeeds as a bush or standard ; extensively grown against walls exposed to the north. It is the most esteemed for culinary purposes, preserving, and confectionery of all cherries.

*Red Morellos or Kentish.*—Flesh pale ; juice uncoloured.

**FLEMISH RED (Montmorency), or Gros Gobet.**—Fruit above medium size ; skin smooth and shining, clear red, changing to dark red by hanging ; flesh tender, very juicy, and briskly acid ; ripe middle to end of July ; tree moderately vigorous, makes a neat orchard tree, and fertile pyramid.

**KENTISH.**—Fruit medium sized ; skin pale red, becoming dark red or black if allowed to hang ; flesh tender, juicy, and briskly flavoured ; ripe middle to end of July ; tree vigorous, hardy, forming fruitful bushes and standards. It is considered the best cooking cherry and a sweetmeat when preserved.

### LIST OF SELECT CHERRIES IN ORDER OF RIPENING.

#### DESSERT VARIETIES.

##### June.

Early Purple Gean.  
Guigne d'Annonay.  
Belle d'Orleans.  
Early Rivers.  
Early Jaboulay.  
Early Red Bigarreau.  
Werder's Early Black.  
Bigarreau de Schrecken.  
Empress Eugenie.

##### July.

Black Tartarian.  
Bohemian Black Bigarreau.

Bigarreau de Gueben.  
Waterloo.  
Governor Wood.  
Belle de Choisy.  
Frogmore Early Bigarreau.  
May Duke.  
Black Eagle.  
Ludwig's Bigarreau.  
Elton.  
Bigarreau de Mezel.  
Royal Duke.  
Reine Hortense.  
Büttner's Black Heart.  
Archduke.  
Duchess de Palluau.  
Mammoth.

Nouvelle Royale.  
Bigarreau.  
Tradescant's Heart.  
Bigarreau Napoleon.

##### August.

Florence.  
Late Duke.  
Emperor Francis.  
Coe's Late Carnation.  
Guigne de Winkler.

#### CULINARY VARIETIES.

Kentish.  
Belle Magnifique.  
Morello.



## SELECT VARIETIES IN ORDER OF SUCCESSION.

*Twelve for quality.*

Early Rivers.  
 Early Red Bigarreau.  
 Black Tartarian.  
 Governor Wood.  
 May Duke.  
 Elton.  
 Black Eagle.  
 Bigarreau de Mezel.  
 Reine Hortense.  
 Tradescant's Heart.  
 Bigarreau Napoleon.  
 Florence.

*Cherries for exhibition.*

All the above ; and  
 Werder's Early Black.  
 Bigarreau Noir de Gueben.  
 Bigarreau de Schreken.

Bohemian Black Bigarreau.  
 Belle de Choisy.  
 Mammoth.  
 Nouvelle Royale.

*Twelve hardy and free-bearing.*

Early Rivers.  
 Werder's Early Black.  
 Bedford Prolific.  
 Governor Wood.  
 Waterloo.  
 May Duke.  
 Black Eagle.  
 Elton.  
 Büttner's Black Heart.  
 Bigarreau.  
 Late Duke.  
 Bigarreau Napoleon.

*Six useful.*

Early Rivers.  
 Governor Wood.  
 May Duke.  
 Elton.  
 Black Eagle.  
 Bigarreau Napoleon.

*Three useful.*

Early Rivers.  
 Waterloo.  
 Late Duke.

*For pies and preserving.*

Kentish.  
 Morello.

## SELECTION OF CHERRIES FOR VARIOUS MODES OF CULTURE.

## COMPACT PYRAMIDS OR BUSHES.

Early Rivers.  
 Empress Eugenie.  
 Early Red Bigarreau.  
 Frogmore Early.  
 Governor Wood.  
 May Duke.  
 Royal Duke.  
 Duchess de Palluau.  
 Nouvelle Royale.  
 Archduke.  
 Late Duke.  
 Coe's Late Carnation.

## LARGE PYRAMIDS OR BUSHES.

Werder's Early Black.  
 Waterloo.  
 Belle de Choisy.  
 Büttner's Black Heart.  
 Ludwig's Bigarreau.  
 Reine Hortense.  
 Black Eagle.  
 Elton.  
 Mammoth.  
 Bigarreau de Mezel.  
 Bigarreau.  
 Bigarreau Napoleon.  
 Emperor Francis.

## COOKING.

Kentish (compact).  
 Belle Magnifique.  
 Morello.

## FOR ORCHARDS.

Early Rivers.  
 Werder's Early Black.  
 Governor Wood.  
 Waterloo.  
 May Duke.  
 Black Eagle.  
 Elton.  
 Büttner's Black Heart.  
 Bigarreau.  
 Turkey Black Heart.  
 Bigarreau Napoleon.  
 Late Duke.

## COOKING.

Kentish.  
 Morello.

## FOR WARM SOILS AND SITUATIONS.

Belle d'Orleans.  
 Bedford Prolific.  
 Florence.

## SOUTH WALL.

*For earliness and quality.*

Early Purple Gean.  
 Belle d'Orleans.  
 Early Jaboulay.  
 Early Red Bigarreau.  
 Empress Eugenie.  
 Frogmore Early.  
 Bigarreau de Schreken.  
 Governor Wood.  
 Black Tartarian.  
 Bigarreau de Mezel.  
 Bohemian Black Bigarreau.  
 Florence.

## EAST WALL.

Early Rivers.  
 Werder's Early Black.  
 May Duke.  
 Waterloo.  
 Royal Duke.  
 Ludwig's Bigarreau.  
 Black Eagle.  
 Mammoth.  
 Archduke.  
 Nouvelle Royale.  
 Coe's Late Carnation.  
 Late Duke.



HIGH WALLS.	<i>White.</i>	Bigarreau de Schrecken.
<i>South or East.</i>	Governor Wood. Bigarreau Napoleon. Florence.	Governor Wood.
Elton.	FOR EARLY FORCING.	May Duke.
Belle de Choisy.	<i>Trellises.</i>	Black Eagle.
Reine Hortense.	Early Rivers.	Archduke.
Bigarreau.	Black Tartarian.	Nouvelle Royal.
Tradescant's Heart.	Governor Wood.	Florence.
Bigarreau Napoleon.	<i>Later—Houses.</i>	Late Duke.
NORTH WALL.	May Duke.	<i>Large Growers.</i>
Bedford Prolific.	Elton.	Early Jaboulay.
Belle Magnifique.	Mammoth.	Black Tartarian.
Morello.	FOR POTS.	Bohemian Black Bigarreau.
FOR LONG HANGING.	<i>Compact Growers.</i>	Elton.
<i>Black.</i>	Belle d'Orleans.	Reine Hortense.
Black Tartarian.	Early Rivers.	Bigarreau.
Black Eagle.	Early Red Bigarreau.	Bigarreau de Mezel.
Tradescant's Heart.	Empress-Eugenie.	Mammoth.
		Duchess de Palluan.
		Bigarreau Napoleon.
		Belle Magnifique.
		Tradescant's Heart.

## PROPAGATION.

The cherry is raised from seed to originate new varieties and obtain stocks, layering being occasionally practised to secure stocks of particular kinds, and fit some varieties for special mode of culture, and the finer varieties are perpetuated and increased by budding and grafting.

*Raising New Varieties.*—Mr. T. A. Knight has stated that the cherry sported more from seed than any other fruit subjected by him to cross-fertilisation, and expressed his belief that it was capable of higher perfection than cultural effort had yet attained; he originated the fine varieties Black Eagle, Elton, and Waterloo. Excellent sorts have at various times been introduced from the Continent, and some new varieties have been raised in England, the finest of all early cherries by Mr. T. Rivers, namely, Early Rivers. Yet there is room for improvement, particularly in those essential requirements of our climate, hardness of constitution in the tree, and endurance of wet in the fruit. These are characteristics of English-raised varieties, none, perhaps, equalling Waterloo in its endurance of wet weather, and raisers must not lose sight of those desiderata in seeking to originate improved varieties. Some varieties reproduce themselves more or less certainly from seed, but there is no reliance to be placed upon any of them to do so with accuracy. Even the wild Gean varies in its seedlings, but the further removed from the type the parents are, the less becomes the danger of reversion in the seedlings.



The stones resulting of fertilised flowers may be treated as advised for raising stocks from seed, but for proving the seedling trees by planting, they require to be planted farther apart, lifting them annually after the first transplantation, and increasing the distance so as to expose them fully to light and air until they form blossom buds. Curtailing the roots and inducing a fibrous habit conduce to early puberty, while budding or grafting the seedlings on older trees accelerates the fruiting of the varieties.

Stones of the Gean and Mahaleb cherry may be stratified in sand or light soil till early spring, or, preferably, sown as soon as the fruit is ripe and can be separated from the pulp, placing them, rather thinly, in drills 1 foot apart, and  $1\frac{1}{2}$  inch deep, covering with fine soil. Every fifth row may be left out, thus forming beds with alleys between for facility of cleaning. In two years the seedlings will be fit to transplant 18 to 24 inches apart, in lines 36 to 42 inches asunder, and the following summer are fit to bud, or graft after a year's growth.

*Layering.*—Though sometimes practised to induce a dwarf fruitful habit, this method of increase is not generally applicable to the cherry, for the wood is too brittle to admit of bending, and, except for trees to be grown in pots, is not a desirable mode of propagation. Instructions on layering are given in Vol. I., pages 102-105, the ringing method being the most eligible for the cherry. Pigmy trees laden with ripe fruit are attractive for table decoration, and charming for juvenile parties.

*Stocks.*—These were treated in Vol. I., page 111, but we reiterate the statements that seedlings of the wild cherry or Gean are suitable for the Gean, Heart, and Bigarreau varieties. The common or dwarf, which are seedlings of the Kentish and Morello, are adapted for the Duke, Kentish, and Morello varieties. The Mahaleb is the principal dwarfing stock, though its influence is not great, and it is not suited to the Gean, Heart, and Bigarreau races, for, though they take and thrive on it for a few years, they soon become unhealthy, yet those fine black and light coloured varieties, Early Rivers and Governor Wood, succeed admirably, and probably others of the cross-bred varieties would thrive on this stock. Seedlings from the red cherries afford greater immunity from gum, because the bark is slightly thicker and more elastic. Indeed, seedling Morellos are the best free stocks for garden trees.

*Budding.*—No bud takes more surely and quickly than that of the cherry if the precaution is taken to operate before the buds become too plump, and when the sap flows freely. This usually occurs about midsummer, and may be performed up to mid-July in



late seasons. Cloudy weather should be chosen for the operation, and care taken to select wood buds. For instructions on budding, see Vol. I., pages 115-120. Budding is the best mode of propagating the cherry.

*Grafting.*—Should the buds fail, the stocks may be grafted the following spring, proceeding by whip-grafting, Vol. I., pages 122-128. Particular care must be bestowed on the selection of scions, choosing those with firm wood and having wood buds. Vigorous shoots with large pith may succeed when taken off in good time, but they are not so desirable as the moderately strong shoots. Some contain only blossom buds with a wood bud at the extremity. This must be retained, for success depends upon the presence of a wood bud or buds in the scion. The shoots for scions should be cut off and inserted in the soil during the first mild weather in January or soon afterwards. This is important, because scions cut off when wanted for grafting often fail, whilst shoots cut off early in the year and kept in the soil in a shady place until the stocks have begun to grow, nearly all succeed when grafted.

The end of March or beginning of April is the proper time to operate. The sap is then sufficiently active to effect a speedy union of stock and scion, and that without danger of gumming, provided the cuts are clean, and the wounds covered without delay with grafting-wax. Claying is not nearly so good as plastering the wounds with grafting-wax, which stops any exudation and prevents gumming.

Whether budding or grafting is practised, stocks for dwarf trees should be worked at 6 to 9 inches from the ground, quarter standards at 18 inches, half standards at 3 feet, three-quarter standards at 4 feet 6 inches, full orchard standards at 6 feet in height. Riders or trees on tall stocks are sometimes employed for covering the upper part of high walls, or buildings where cattle have access to the lower parts, the stems there being protected, and are usually 7 feet 6 inches in height. The seedling or stock cherries grow faster and straighter than the cultivated sorts; therefore, it is advisable to form the stems of the stocks.

Double grafting is a desirable method of securing the Gean, Heart, and Bigarreau cherries on Mahaleb roots for garden trees. The seedling Morello forms an excellent intermediary. Double grafting is exemplified in Vol. I., pages 128-130. Budding, however, is preferable to grafting.

#### SITE AND SOIL.

*Situation.*—The cherry does not succeed everywhere; at least, its cultivation in



orchards is not practised in all districts. The principal counties in which cherries are produced in large quantities are Kent, Hertfordshire, and Buckinghamshire, where the ground is undulating. Perhaps the best possible site is a gentle southern slope, above the fog-line of the valleys and hollows of the neighbourhood, for cherry blossom rarely suffers from frost, except in low and level tracts. Dampness of soil or site is the cause of more gummed and wrecked cherry trees than unfitness of our climate for cherry production; it may be observed that cherries, however, succeed in favourable sites and on every aspect from Cornwall to Morayshire.

Cherries in gardens require the most open situations. They never succeed in low, damp parts, and detest still air. They thrive in borders at the sides of walks in bush, pyramid, or espalier forms, and trained to walls. The earliest varieties should be planted against south walls; all varieties succeed on east aspects, also against west walls, but we do not advise west aspects when the fruit requires to be preserved some time on the trees after ripening, for there is there the greatest loss in cracked cherries than on any other aspect. North walls suit all the varieties of the Duke and Morello races. May Duke and others succeed there, and afford supplies of fruit until September, but the quality is not so good as that from sunnier aspects. The Gean, Heart, and Bigarreau varieties do not produce well on north walls.

*Soil.*—The Kent cherry-orchards, especially those noted for producing the finest cherries seen in the world's greatest market ever since the time of Henry VIII., namely, those in the Sittingbourne, Newington, and Teynham districts, are on a deep loam, overlying a calcareous sandstone (Kentish Rag). West Hertfordshire and Buckingham cherry-orchards are on deep loams, resting on silicious or calcareous strata. Cherries thrive on the soft sandy soil of Middlesex and Surrey, between Esher and Hampton Court; they luxuriate on the dry, high, Epping plain, and the May Duke, which does not fruit well everywhere, bears abundant crops on the Woburn Sands, near Bedford. Fine cherries are also produced on the rather heavy soils of the flinty (calcareo-silicious) lands of East Kent; and splendid trees, bearing abundant crops of Heart and Bigarreau cherries, are occasionally seen on the silicio-calcareous soil, overlying chalk, in some parts of Hertfordshire, many trees having a spread of over 60 feet, and being nearly as much in height. In these orchards on chalk, the Duke race are gummed wrecks, profitless skeletons. The cherry fails completely on a clay subsoil; and only flourishes for a time on shallow loam overlying gravel, eventually gumming to death before attaining a great size or age, and it will not



thrive in shallow soils overlying chalk. Nor will it succeed in peaty soils without calcareous matter. In rich alluvial soils it thrives only on knolls having an unknown depth of sand below, in which water does not lodge.

A free, deep soil suits the cherry. It prefers rain-wash—detritus worn from hill-sides, incumbent on rock; soft, sandy loam, underlaid by sand; light, mellow soil, overlying sandstone; deep loams, interspersed with calcareous matter; and loams commingled with flints. All soil for cherries must be sweet, water not standing within several feet from the surface; indeed, naturally drained soils only are suitable for large cultures.

In gardens, any good loamy soil will grow cherries. If the soil be not suitable it can be made so by draining 4 feet from the surface, and appropriate blendings. Clay soil may be rendered sufficiently friable by the addition of one-third of light loam, or road scrapings, and a tenth of quicklime, mixed and left a few months to sweeten, then incorporated with the clay to a depth of 2 feet, loosening the bottom; drift or sharp sand also renders the soil more porous. Old mortar rubbish may be added to soils deficient in calcareous matter, and those rich in humus, or vegetable matter, should also have a good liming. Where the soil is totally unfitted for the growth of the cherry, proper borders must be made, instructions for which will be given under "Culture under Glass." Deep stirring of natural soils is necessary for cherries on free stocks. Rank manure ought not to be mixed in the soil in preparing it for planting, but charred refuse, burnt clay, old mortar rubbish, and broken sandstone are valuable additions.

Where the soil is unsuitable for trees on the wild cherry stock, such as strong, white, upland clays, or thin soils on chalk, or on gravel, trees on Mahaleb stocks may be chosen, then by mulching, top-dressing, and general good management, success may be expected, except in low, wet localities.

#### PLANTING.

Trees for their respective purposes should be selected from the nurseryman's stock, clean in bark, straight in stem, free from gum, and moderately strong in growth, with the wood firm, and the buds plump. They should be lifted carefully, the roots kept from the drying influences of the air, and the pernicious effects of frost. Planting may be performed as soon as most of the leaves have fallen, always in mild weather, and when the ground does not form into a puddle in working. The roots must be spread out evenly and straight, using some tolerably rich free soil under, amongst, and over



them, after cutting all broken ends smooth, proceeding in the manner detailed in the chapter on planting, pages 137-154, Vol. I.

*Distances for the Trees.*—Trees on wild cherry stocks of the Bigarreau and Heart varieties as standards for orchards should be planted 30 feet apart, or 36 to 40 feet in rich soil; those of the Duke and Morello races of the upright-growing sorts, such as May Duke, will be accommodated at 18 to 21 feet apart; and the spreading kinds, such as Morello, at 21 to 24 feet apart. Wall trees, of the Bigarreau and Heart varieties, may be placed 24 feet apart, against walls of 12 feet or more in height; May Duke and similar varieties 15 to 18 feet apart, allowing an increase of distance between the trees of double that of the decrease in walls below the above-mentioned height. Espalier trees should be planted at the distances named for walls, that is, 24 feet apart for the strong, and 15 to 18 feet apart for the moderate growers, having recourse to root-pruning if the trees grow too luxuriantly.

Bushes and pyramids should be 12 feet asunder for the free-growing Bigarreau varieties; May Duke and similar kinds answer at 9 feet; but at those distances the trees must be subjected to root-pruning, of which trees on wild cherry stocks are impatient; indeed, cherries on these stocks are only suitable for standards in orchards, and for covering large wall or trellis areas in good soils, or where root-pruning will not usually be necessary. The trees should be 3 feet further apart between the rows than in the rows.

For espaliers, bushes, pyramids and cordons, cherry trees are most serviceable on Mahaleb stocks. The strong growers (double worked), for espaliers or walls, should be planted 15 to 18 feet apart; Duke and Morello races 12 to 15 feet apart; bushes and pyramids 6 feet apart in the first instance, thinning to 12 feet for the strong-growing sorts; moderate growers  $4\frac{1}{2}$  feet apart, thinning to 9 feet. If the trees are to be subjected to root-pruning, 3 feet less distance suffices for permanent trees, namely, 9 feet for the strong, and 6 feet for the moderate-growing kinds, at which distance they may be planted at first, or at half-distance, taking out every other tree when the permanent trees require room. Cordon trees:—single upright, 18 inches apart; single diagonal, 2 feet apart; strong growers, 6 inches more. Upright, three to six branched trees may be planted at the distance in feet corresponding to the number of branches.

#### TRAINING.

The forms usually employed are: 1, standard for orchards; 2, bush and pyramid;

3, fan and horizontal for espaliers, walls, and trellises; 4, cordons. The requisite details for producing these forms, generally from the maiden to the fruiting tree, have been given under their respective headings (pages 1--25), but a few remarks on each, having special reference to the cherry, are imperative.

*Standards.*—This shape will be found under "Apple," page 26. It is important that the stem be sturdy and tapering so as to insure its supporting the head erect. This is effected by encouraging side-growths moderately, but not allowing them to interfere with the leader, and they must not remain beyond the autumn, but be cut close to the stem in October, and the wounds dressed with shell-lac solution.

In forming the head, the first three growths should be originated as far apart as is consistent with the object in view, taking them at an angle of not less than  $45^{\circ}$  to the stem, for when the branches come out at an acute angle, gumming is often engendered; therefore, select those to remain that start nearly at a right angle. This is more necessary to be observed with the upright-growing varieties than those which are spreading and pendulous. Spring is the best time to shorten the growths of young cherry trees, just when the buds commence bursting. Upright growers should be pruned to outside buds; spreading growers may be shortened to inside buds. Strong growers should be left longer at the first pruning than the moderate-growing sorts, shortening Bigarreau and similar vigorous kinds to 15 to 18 inches, taking one shoot at the end, and the other 3 or 4 inches lower on each branch, thereby allowing room for the branches to swell without colliding. Other shoots may be rubbed off, preferably pinched. After the six principal branches are originated, pruning will be limited to keeping the head open, preventing the growths crossing each other, and maintaining equal vigour as nearly as possible in the principal branches.

*Fan-trained trees.*—These may be originated as described for that form on page 184, Vol. I., starting the growths about 6 inches apart on the stem, and afterwards forking them so as to cover the space equally with branches at 9 inches asunder for Duke cherries, and 1 foot for the Bigarreau, and similar strong-growing sorts. A few illustrations will explain this mode of training the cherry.

The maiden tree, *A* (Fig. 40), is cut down to 1 foot from the ground in autumn or early spring, as shown by the bar. This causes several shoots to push the following summer; three only of the sturdiest and best situated ought to be retained, as indicated by the dotted lines, *C*. If all the shoots were allowed to remain the branches would ultimately become jammed, and gum disease follow as the consequence. This ought to be guarded



against by rubbing off the superfluous growths whilst quite young, as shown in the detached foliate shoots in *B*. The tree is then prevented wasting its energies on worse than useless shoots, as indicated in dotted outline, and the shoots retained benefit by the sap concentrated upon them, and the wood thereby becomes stouter, with freer channels, also thicker and more elastic bark. These are important considerations in laying the foundation of the future tree; therefore remove all the growths that push in the first year of training, except the leader *p*, and side shoots *q*. Train the side shoots at an angle of about  $45^\circ$ , depressing the strong and elevating the weak, so as to insure equal vigour in both. If any laterals are produced, pinch them at the first leaf, and to one joint of subsequent growth. When the leaves fall, or preferably in early spring, shorten each branch

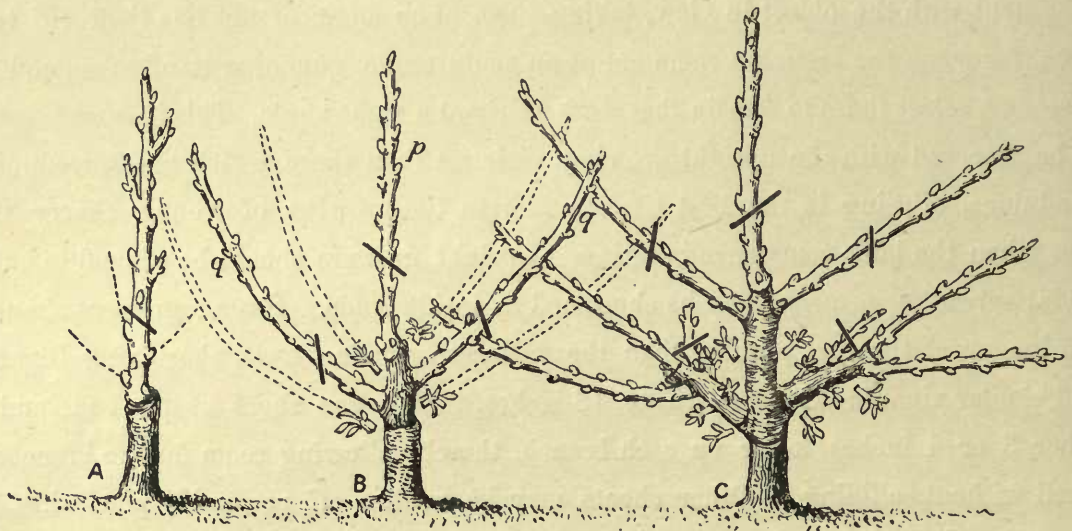


Fig. 40. ORIGINATING FAN-SHAPED CHERRY TREE.

*References* :—*A*, maiden tree, headed. *B*, one-year-trained tree, showing disbudding and shortening; *p*, leader; *q*, side shoots. *C*, two-years-trained tree, indicating pruning.

to 6 inches from its base. This for the Duke and Morello races; the Bigarreau and similar strong-growing sorts should have the branches shortened to 9 inches, always to plump well-situated buds. The second pruning is represented by the bars in *B*.

In the second year of training (*C*) a leader and two side shoots are taken from the leading branch, reserving the side growths near the upper part so as to obtain a good distance between them and the first side branches, rubbing off all others on the stem, as shown by the detached growths. The side branches will push several growths. Two only must be retained for extension on each, and as near as practicable at their extremities, pinching the remainder at the fifth leaf (or third, not counting the basal leaves), and subsequent growths from them at the first leaf. Some of the growths on

the side branches will not elongate beyond a few leaves. These may be spurs, and will form blossom buds for fruiting another year. The temptation is strong to retain them all, but that is not wise, because more are produced than there is ultimately room for; therefore some of the growths ought to be rubbed off, leaving the shoots for stopping or spurs about 4 inches apart, and removing all those on the side next the wall. This is apt to be overlooked in the training of the young tree, and the consequences are the branches are formed on the wrong side, and have to be cut away, or brought into position at an acute angle when the tree is planted in its permanent place. Be careful to retain no more growths than those absolutely necessary to form the framework of the tree and furnish the branches with spurs. Keep the stem clean and the branches duly provided, yet not overcrowded, with spurs.

The tree marked for its third pruning is shown in *C*. The leader is shortened to 6 inches, the upper side branches to 9 inches each, and the pinched growths are cut back to an inch of their base. The lowest side branches, which have been forked, need not be shortened, because they are the proper distance apart, and from their position will push essential growths their entire length, consisting mainly of spurs, with an extension shoot at the extremity of each. In the third season the tree will produce some fruit, generally more than is represented in the illustration (Fig. 41), for fruit is generally borne on the preceding year's wood.

If the tree is intended for a low wall or espalier two growths only need be encouraged from the leader, and two from each of the upper side branches and a continuation growth from each of the four lowest branches. This is portrayed in the right side of the tree, Fig. 41, the disbudding and stopping being identical with those of the preceding season. If the tree, however, is intended for training to a high wall, a leader must be encouraged, and this shortened to 12 inches at the next winter pruning, as indicated by the line across the shadowed leader. Three growths should be taken from the leader the following year, as shown in the dotted lines. The other branches will not need shortening, for they will push growths vigorously, and two should be encouraged from the extremity of each as required for covering the space with branches at the proper distance apart. This is ample for furnishing the lower part of the wall, and the upper part can easily be clothed by shortening the leader for originating the requisite number of branches. It is usual by this method to train the bottom pairs of branches horizontally, keeping these longer than the others as growth is advancing, so that the entire wall or trellis space may be covered with fruitful wood.



Assuming the tree (Fig. 41) to be intended for training to an ordinary wall or trellis, the two central branches only will need shortening to the extent indicated by the bars, the remaining eight being left intact. In the fourth year two shoots should be taken forward from each of the cut-back branches, and two from the end of each of the next two branches on both sides of the tree, the two lowest branches being continued as in the previous year. With proper attention the tree will be well furnished with branches of equal vigour and not require any winter pruning, except shortening lateral growths, which will be treated presently.

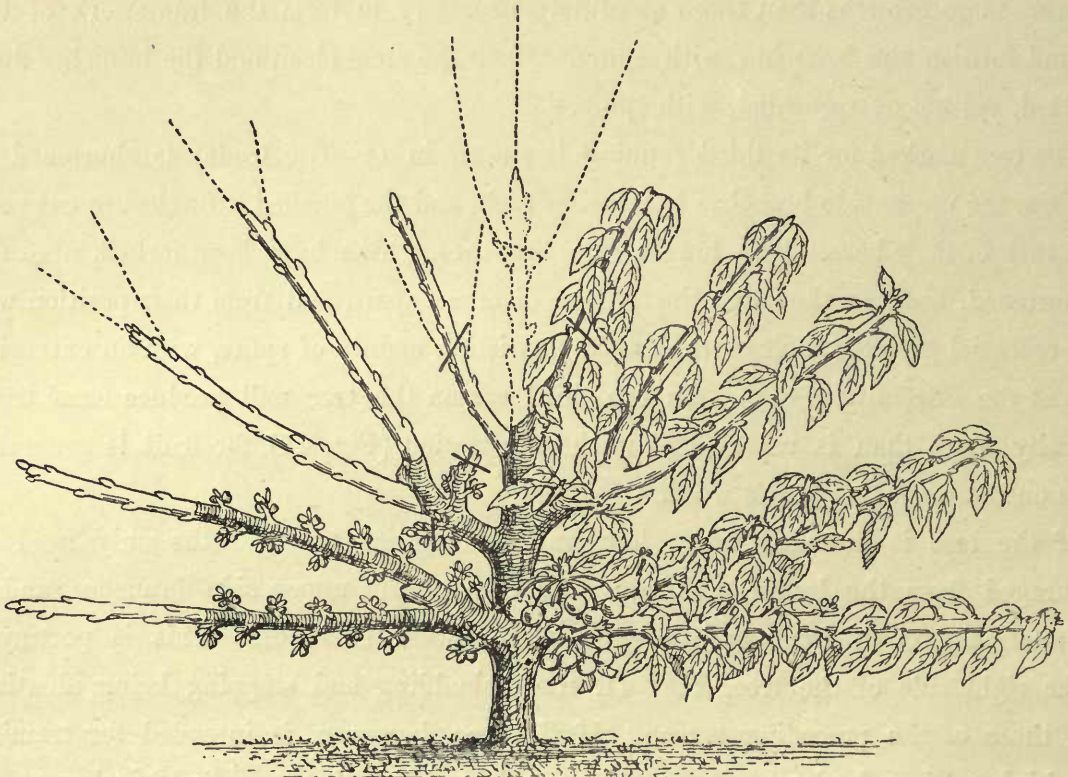


Fig. 41. FAN-SHAPED CHERRY TREE, THREE YEARS FROM THE MAIDEN.

In the fifth year two growths should be encouraged from the extremity of each of the four branches originated by shortening the two central growths at the fourth pruning, but a continuation of the growth of the remainder will only be necessary for giving the requisite number of branches at the proper distance apart. The tree will then be in the form of a semicircle by the end of the fifth year's training, and in a healthy, fruitful condition, as represented in the engraving, Fig. 42.

After the tree is fully furnished, as depicted on the opposite page, the branches only need continuing and forking as required to cover the space equally with bearing wood

until the limit is reached; then all growths must be treated as detailed under "Spurs." The numerals indicate the year's growth of the tree.

For espaliers and low walls the branches are often trained horizontally after being originated in fan fashion, taking them up with a gentle curve to their respective positions on the wall or trellis, then continuing them without branching. This method is superior to horizontal training from the first, because the lower branches are more or less inclined upward, and any vacancy occurring through accident is easily filled by training in fresh growths. This is impracticable in true horizontal training; hence fan training is most appropriate for all kinds of stone fruit trees. Two distinct systems of

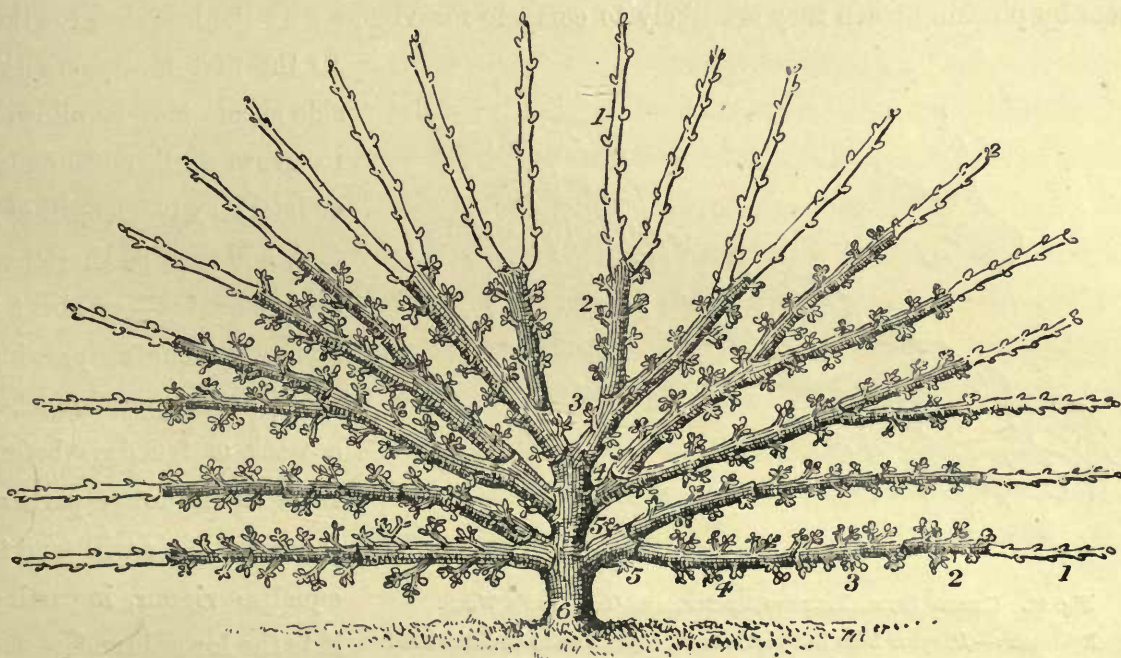


Fig. 42. FAN-SHAPED CHERRY TREE, FULL TRAINED.

training, however, are practised on the cherry. The plan described, or modified forms of fan training, is that usually followed with the Gean, Heart, Bigarreau, and Duke varieties: those producing fruit on spurs over an indefinite period from the principal branches; but the Morello cherry requires a different mode of training, owing to its bearing most profitably on the shoots of the preceding year's growth. Therefore, we proceed to give instructions in pruning those varieties that produce their fruit on spurs when full trained.

*Mode of Bearing.*—The cherry produces its fruits on spurs, and on young wood of the preceding year. This applies to all the races and varieties without distinction when grown in natural form, namely, as standards, and not restricted to space by pruning.



The branches extend annually, and some of the buds formed on the shoots made each year are blossom buds, often all, except one or two at the extremity, and a few at the base. In some cases there is a sprinkling of wood buds along the shoots; these develop into spurs the following year. An illustration (Fig. 43) will enable the uninitiated to distinguish the different growths and buds.

*Summer Pruning.*—Whilst the tree is young and foliage is required to accelerate root action, the summer shoots may be allowed to make more growth before shortening than is desirable after it becomes thoroughly established. The side shoots, however, must not be allowed to interfere with the leaders, but be kept subservient to them by pinching when they are likely to compete for vigour with the leading growths.

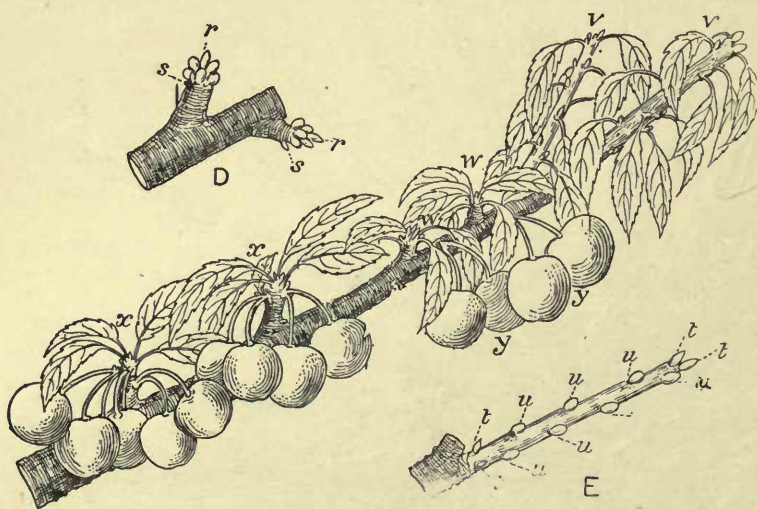


Fig. 43. CHERRY SPURS, FRUITING BRANCH, AND ONE YEAR'S WOOD.

*References:*—*D*, spurs from last year's wood, with blossom buds clustered at their ends and a wood bud at the extreme points, *r*, and at their bases, *s*. *E*, one year's shoot; *t*, wood buds; *u*, blossom buds. *F*, fruiting branch; *v*, current year's shoots; *w*, spurs on last year's wood; *x*, two-years' spurs, fruiting; *y*, fruit produced from blossom buds on preceding year's wood.

In the first few years the side shoots may be allowed to grow until midsummer or later, say to a length of 1 foot, and then be shortened to five leaves—or about 3 inches in length, pruning those on the upper branches a week or ten days before those on the lower parts of the tree. This will tend to equalise vigour, imparting it to the lower branches and causing the leader to make more progress. Subsequent growths from the

shortened shoots should be pinched at the first leaf as made.

The leading shoots, those at the ends of the branches, or emanating from the stem to form branches, need not be shortened where space admits, for they will form wood buds throughout their length whilst young, these for the most part developing into spurs the following season; or when the flush of youth is past, and they are not made to push strong growths by shortening, they will set fruit buds in the year of formation, with some wood buds interspersed, yet not always, as shown in the above illustration, *E*, and the finest cherries are produced from such young shoots the following year.

The foregoing procedure applies to standard as well as espalier or wall trees whilst extending. The summer pruning of standard trees is not attended to so much as they require to keep the heads open and let the sunshine right down to the base of the branches. Standard cherries may be as conveniently pruned in their early years as wall or other form of trees. This consists in removing ill-placed and superfluous shoots, and shortening those desirable for converting into spurs. A tree is then reared with sturdy branches, not crowded but with space between them for the head and shoulders of a man for performing cultural operations, also for admitting light, air, and heat to the centre of the tree. Disbudding, alluded to in forming the trees, is preferable to removing superfluous growths after they become strong and woody, as there is less danger of gumming; and in removing, or thinning and shortening the spurs, which are apt to form on old trees in clusters, it is best to operate in summer after the fruit is gathered, thinning them neatly out, cutting away the parts furthest from the branch, and retaining those nearest to it, in order that the sun may have free access, and the fruit benefit by its influence. The treatment of the summer growths and spurs will be made clear to the inexperienced by the engravings on the next page.

Summer pruning should be performed in June and July, full-grown trees having all the growths pinched at the fourth or fifth leaf. This includes the basal leaves, and is represented in the illustration, Fig. 44, *G*, also the subsequent pinching. These growths should be shortened early in October to an inch of their base, or just above the second or third joint, counting the basal buds, which in favouring circumstances will have been converted by the stopping into semi-spurs, namely, prominent double or triple buds, and one a wood bud. If the last is not present, the shoot must be cut back to the first wood bud beyond the fruit buds, for it is essential that all pruning be made at a wood bud, or to a spur having one or more wood buds, so as to provide for future growth and crops.

Spurs ought to be thinned or shortened from the middle to the end of August, or as soon afterwards as the fruit is gathered, and all pruning needed by the cherry should be completed in October. The Guignes and Bigarreaus are very impatient of pruning, and should be allowed to extend as much as possible until their vigour becomes subdued by bearing; then they are nearly as tractable as the May Duke and Morello races. Winter pruning will not be required, except for shortening shoots in young trees to originate growths for furnishing them with branches in proper places. This is best done in October, or in spring when the buds are swelling.



*Training Morello Cherries.*—Reference has already been made to the Morello class of cherries. Some of these are cross-bred with the Duke race and produce fruit freely on spurs, but others, especially the Morello itself, produce slender shoots, and bear on those of the preceding year's growth; all the buds along the shoot are often blossom buds, with a wood bud only at the extremity, and one or more at the

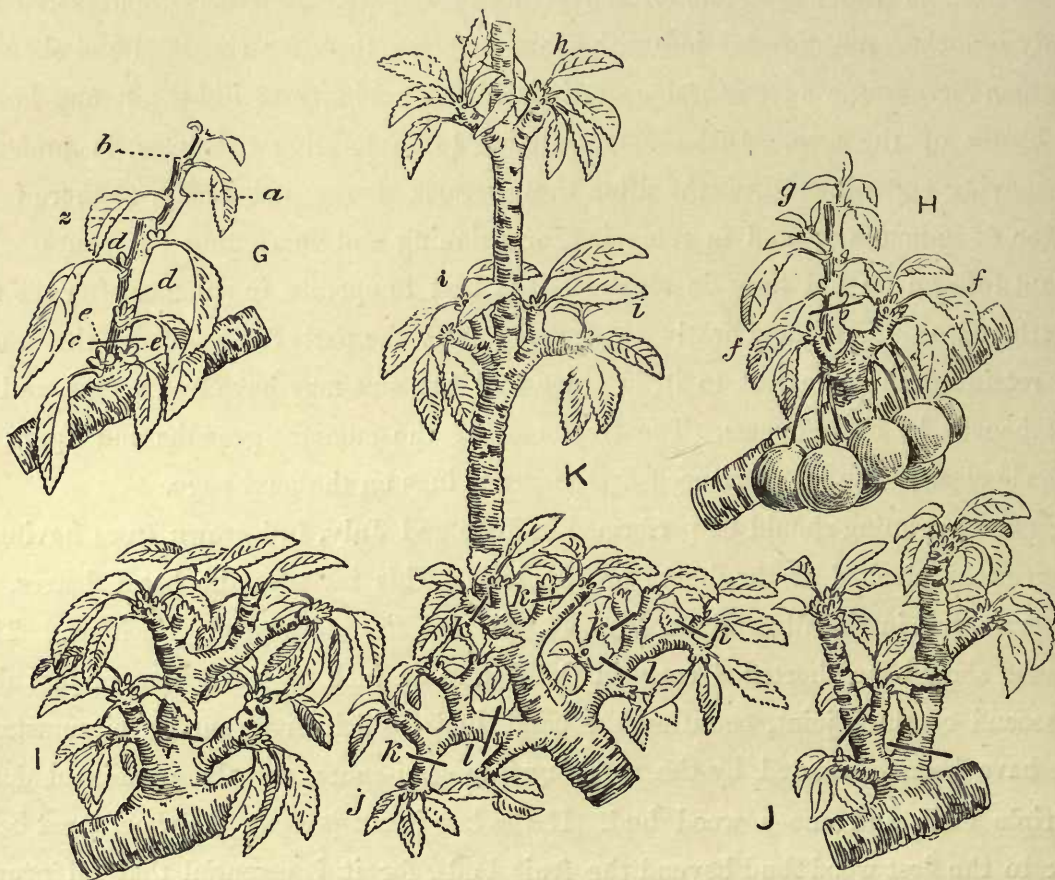


Fig. 44. CHERRY.—SUMMER PRUNING, SPUR FORMATION, SHORTENING SPURS.

*References:*—*G*, shoot pinched, namely, *z*, first at fifth leaf; *a*, lateral to one leaf; *b*, sub-lateral at first leaf; *c*, point of shortening at winter pruning; *d*, wood buds; *e*, blossom buds; there is a wood bud on the other side of buds, but it is not shown. *H*, last year's formed spur, producing fruit and forming spurs *f*; *g*, growth from basal wood bud, pinched at fifth leaf, point of shortening in autumn indicated by the bar. *I*, spur become crowded, extent of shortening needed represented by the bar; *J*, attenuated spur requiring shortening to the bars; *K*, spurs on branches of standard trees; *h*, two-year spurs; *i*, three-year spurs; *j*, four-year spurs; *k*, thinning indicated by the bars; *l*, shortening by the bars.

base. This is a characteristic of all varieties grown as standards. The Duke and its cross-bred varieties make stubby growths, and are more amenable to spur pruning than varieties which make long and less sturdy shoots; the latter are pruned into sterility, or produce less abundantly than on the spur system. Thus we find the



Bigarreau, Guigne, and Heart varieties in the freer growers almost sterile as close pinched bushes and spur-pruned against walls, whilst trees of the same varieties in orchards are borne down by their weight of fruit. Those, therefore, that do not produce large fruit freely on the spur system should be treated as advised for the Morello, making allowance for the increased size of growth and foliage.

The fruit of Morellos being produced on young wood, the summer growths ought to be thinly disposed but not shortened. A succession of such young wood must be maintained, and whilst some shoots are bearing others should be trained in to replace them, for at the end of the year the bearing part must be cut away.

The most advantageous method of training the Morello Cherry is the fan, originating the principal branches as described under "Apricot—modified fan," but the growths must be treated in the manner shown in the engraving, Fig. 45, in which is shown an eligible method of training the Morello.

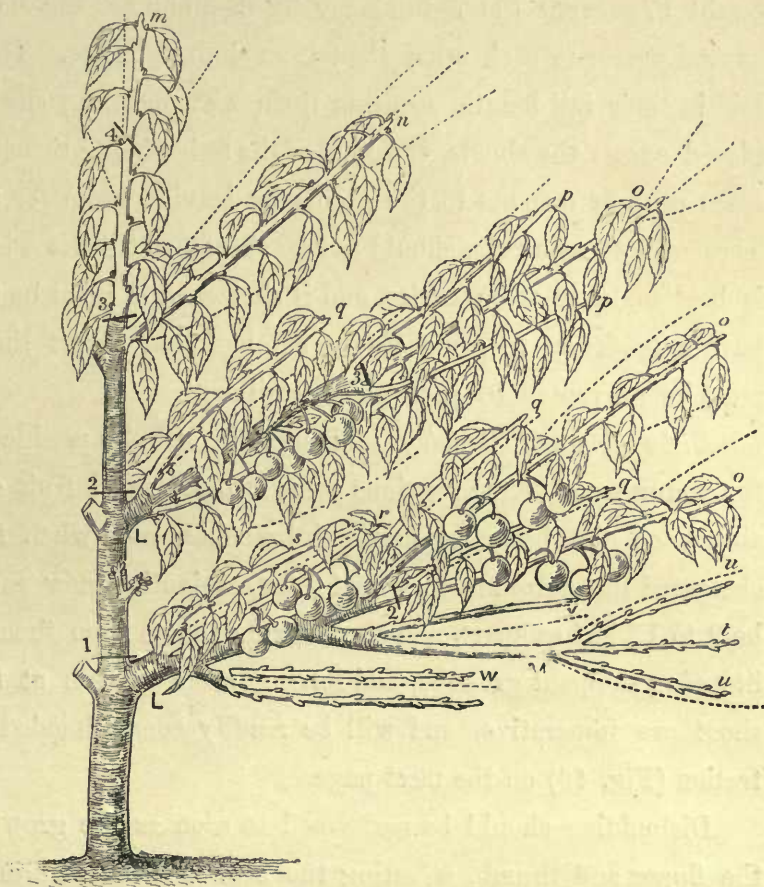


Fig. 45. THREE-YEARS SEMI-FAN-TRAINED MORELLO CHERRY.

References :—*m*, leader marked for pruning ; *n*, side shoot not shortened. *L*, extension branches bearing fruit on previous year's growth ; *o*, leaders of extension branches ; *p*, side shoot from end of preceding year's wood ; *q*, side shoots from base of previous year's growth ; *r*, side shoot of previous year bearing fruit ; *s*, successional shoot from base of current bearing shoot, to fruit the following year. *M*, leafless sub-branch ; *t*, extension shoot ; *u*, side shoots laid-in near end of previous year's wood for following year's bearing ; *v*, basal shoot for future year's bearing ; *w*, side shoot, fruited, cut away ; *x*, shoot to supplant that cut away after bearing. The dotted lines indicate growths in the fourth year of training. The numerals refer to the years of pruning.

The procedure named must be continued until the tree occupies its allotted space, then all the growths from the main and sub-branches will need to be treated as biennials, as before described. This, however, may not be pursued indefinitely, for some of the



branches will become enfeebled by continued bearing, and also too long for their places; therefore, it is not only necessary to provide a succession of bearing wood, but to encourage vigorous growth by cutting away weak branches after fruiting. The Morello cherry produces a greater number of young shoots than should be retained. Cultivators ought to prevent the redundancy by disbudding, and no shoots should be allowed to extend nearer to each other than from 4 to 6 inches. These summer shoots should be laid in their full length, securing them with matting, shreds, and nails, or small twigs placed across the shoots, the ends of the twigs being thrust under the branches. In all cases prevent damage to the shoots by leaving room for them to grow in the ligature. These shoots, as a rule, should not be shortened till the winter pruning; in most cases it is best to leave them entire, and if shortened it must be to a wood bud. Some shoots have a tendency to grossness in summer and divert the sap from the weaker. This must be prevented by judicious curtailment.

*Disbudding and Stopping.*—Though the Morello produces the finest and most fruit on the young wood of the previous year, it bears good fruit on spurs, these seldom being absent on the branches and sub-branches, and when the bearing growths become elongated the spurs are very useful for originating new growths. The branches should be 9 to 12 inches apart, and the bearing shoots from them be 12 to 15 inches asunder. Stopping rampant growths, and having some growth at the extremity of the fruiting shoot are imperative, and will be readily comprehended by examination of the illustration (Fig. 46) on the next page.

Disbudding should be performed so soon as the growths can be taken hold of with the finger and thumb, selecting the best situated and most promising for training-in; these ought to be on the sides of the branches, rubbing off those next the wall and on the face of the branches, reserving no more than are essential for forming the trees and furnishing them with bearing wood. Never allow growths of a useless character to be made. Pinching, for reasons before given, must be practised on all growths requiring it whilst young, not permitting more than two joints to be made beyond the stopping point before shortening the shoot. It is important for the proper swelling of the fruit that every shoot or spur have growth beyond or level with the cherries.

*Winter Pruning the Morello.*—As the trees are usually grown against north walls and the fruit often hangs until October, the general pruning is frequently deferred until February or March. Circumstances often cause deviation from correct practice, and pruning Morello cherries in severe weather is not commendable. The growths that have borne fruit

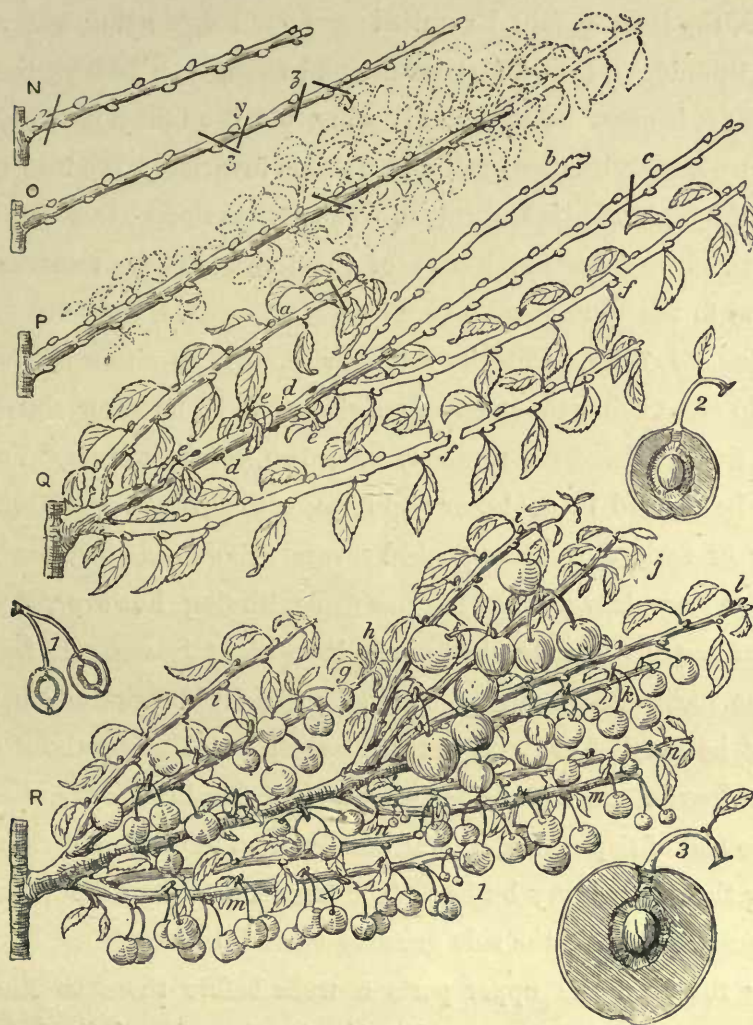


Fig. 46. SHORTENING, DISBUDDING AND PINCHING, ALSO THINNING FRUIT. RIGHT AND WRONG PRACTICE.

*References* :—*N*, one year's shoot, pruning (wood) buds at the end and base only; if shortened it must be at the bar. *O*, one year's shoot with blossom and wood buds; *y*, right pruning (wood) buds; *z*, wrong pruning (blossom) buds. *P*, one year's shoot, all wood buds, not shortened or disbudded; result in the following year—growths in shadow. *Q*, result of shortening the shoot *P* to the bar; *a*, basal shoot, pinched at about 12 inches (bar) before buds assumed the blossom character; *b*, leafless side shoot pinched—wood buds at the extremity and base only, not shortened; *c*, extension shoot, wood buds at the end and base only, shortened (bar) wrong practice, should be left entire; *d*, ovoid black patches indicate disbudded growth on previous year's shortened shoot; *e*, shoots pinched at third leaf to form spurs; *f*, side shoots shortened (wrongly) after buds had been transformed into blossom buds, terminal wood buds cut away, all others blossom buds, except basal. *R*, results of previous year's (*Q*) practice; *g*, pinched previous year's shoot bearing fruit, unthinned; *h*, extremity growth to attract sap to fruit; *i*, succession shoots, pinched at 12 inches, and to one leaf of subsequent growth; *j*, pinched previous year's shoot fruiting, thinned, growth at extremity and successional shoot (*i*) from base, pinched; *k*, shortened (wrongly) previous year's extension shoot bearing fruit; *l*, shoot from base, unpinched; *m*, previous year's side shoots (wrongly stopped to blossom buds) bearing fruit; *n*, successional shoots from their bases, pinched. 1, Abortive fruit, dropping, stoneless. 2, Ripe fruit from unthinned shoot. 3, Ripe cherry from thinned trusses, double diameter, four times the flesh of unthinned. NOTE.—The bud *y* in *O* ought to have been more pointed—a wood bud; the bud *z* more bold and round—a blossom bud,



and all superfluous shoots are best cut out as soon as the fruit is gathered. When the leaves have fallen, the trees should be untied or unnailed, cutting out any parts that escaped at prior thinnings, cleansing the walls and trees, then re-adjusting the latter to the wall. This work is often deferred until spring, but it ought not to be, for when the sap is active the bark is easily damaged, and wounds invariably produce gum, therefore avoid injuries to the bark and tight fixtures. The earlier these operations are completed in the autumn, the better for the health of the trees. These remarks apply to all varieties as well as to the Morello.

*Bush and Pyramid Trees.*—Cherries are very prolific in either of those forms, the Duke and Morello races being the most appropriate. It is, however, extremely difficult to keep the fruit from birds. The trees may be grown in "fruit cages," Vol. I., page 192. Bush trees may be trained in goblet or cup form, with seven or more branches. These will in late May or early June have pushed several shoots near their ends, all of which must be pinched to three leaves when five are made, leaving, however, the leader to each untouched till ten leaves are made, then pinch it to eight leaves. If the trees are not too strong at the roots, this pruning will be sufficient for the season, but if laterals appear they must be pinched if they extend beyond two leaves, those of the leading growths to three leaves. To induce fertility and check luxuriance, the trees may be lifted towards the end of September, and if this be practised biennially, it affords dwarf trees little larger than gooseberry bushes. The trees must be on the Mahaleb stock.

If large bushes are desired, the side growths should be shortened in June to three leaves, pinching those on the upper parts a week before those on the lower to give strength to the lower part of the tree, and if they break again, pinch them to two leaves, but the leader in most cases will take off the superfluous sap, the buds only swelling to form blossom or spurs. The leader from each branch may be pinched to twelve leaves, more or less according to its vigour, or shortened at the end of August to eight leaves, always to a wood bud. When the trees are full-sized the leaders may be treated the same as the side growths; the chief pruning then required consists in thinning the spurs and shortening those which become too long.

As pyramids the Duke and Morello races on the Mahaleb are handsome and useful. They may be originated in a similar manner to apple trees in that form, taking care to have the branches regularly disposed at about 12 inches apart, and treating their side growths as described for bush trees. In a few years symmetrical trees may be formed, and they may be kept very compact after any height is reached, by close pinching and

root pruning; but root pruning must not be deferred longer than the second year, or the cherry on the common stock gets such strong hold of the soil that it is difficult to root-prune safely. If the trees are on common cherry stocks, they must be lifted biennially until they assume a fruitful state. They must not be closely summer pruned if pruning is not practised, for trees fail to bear when they make strong shoots. The most that should be attempted with large pyramids is thinning the shoots in June and shortening irregularities at the end of August, keeping the heads open by a judicious thinning of the spurs after the fruit is gathered, never after October, and then removing all dead and useless wood.

*Cordons.*—These are very interesting and productive. Single vertical or diagonal are the most eligible forms. The most suitable varieties are those of the Duke race:—Empress Eugénie, May Duke, Royal Duke, Duchesse de Pullau, Archduke and Nouvelle Royale. Early Rivers and Governor Wood are also excellent. These forms are originated in the manner described under “Apples” with the pruning of the cherry.

*Manures.*—The elements of cherry wood, according to Engelman’s analysis, consist of:—Potash, 20·78; soda, 8·40; magnesia, 9·19; lime, 28·69; phosphoric acid, 7·73; sulphuric acid, 3·29; silica, 2·06; iron, 0·07 per cent. Cherry bark constituents are:—potash, 7·46; soda, 14·53; magnesia, 5·10; lime, 41·95; phosphoric acid, 3·26; sulphuric acid, 0·80; silica, 19·98; iron, 0·20; chloride of sodium, 0·62 per cent. For components of fruit, see Vol. I., page 53. Phosphoric acid, potash, and lime are the chief ingredients taken from the ground and that need to be restored to it to maintain its fertility. Magnesia and soda are essential to the wood and bark, forming with lime and silica the best safeguard against disease, and, though small quantities only are required, they must not be absent or the trees cannot remain healthy. They are usually found in the soil or conveyed in manures. Cherry orchards in grass should be grazed by sheep fed with oats, cake, mangolds or swedes. The droppings and urine contain all the essential elements that need be applied to orchard trees. Care must be taken to place the feeding stuff so as to have the ground evenly manured.

In bare soil a dressing of solid manure may be given annually when the trees bear profusely and are not induced to make too much wood. In good soil, cherry trees produce abundant crops for many years without any manure. Continued bearing over several years reduces the resources of the soil, therefore manure is necessary to enable the trees to produce fine fruit. It should be given before the trees become enfeebled. Farmyard and other solid manures may be applied in the manner given on pages 50-52.



Garden trees require very moderate manuring in winter, relying on summer mulching, watering and feeding with liquid manure. When manuring is necessary, the ground may be lightly pointed over in autumn after the leaves fall, scraping the soil off immediately round the trees as far as the branches extend, then giving a dressing of manure or rich compost, covering it with an inch or two of fresh soil taken from the spaces between the trees, spreading that removed. Another plan, and excellent for all descriptions of trees bearing profusely, is to spread some short manure, about two barrow-loads to the square rod, on the surface early in winter and leave it there to decay.

*Artificial Manure.*—That given (Vol. I., page 55) for stone fruits may be employed for the cherry, or the following:—Steamed bone meal, 3 cwt. ; sulphate of potash,  $1\frac{1}{2}$  cwt. ; chloride of soda,  $\frac{3}{4}$  cwt. ; sulphate of magnesia,  $\frac{1}{2}$  cwt. ; and sulphate of lime,  $5\frac{3}{4}$  cwt. ; mixed, per acre. Apply the mixture in February, never later than the swelling of the buds. If the trees crop heavily, apply  $1\frac{1}{2}$  cwt. of nitrate of soda, per acre, soon after the fruit is set. Garden trees are often given double the quantity named when producing heavily, but it must be cautiously imitated in large cultures, using no more than is essential to the maturing of the crops without their exhausting the trees.

Lime may be applied occasionally as a top-dressing at the rate of 5 to 10 cwt. per acre, in autumn or early spring. It is only necessary in soils where the trees are productive of excessive wood and leaf growth. Gypsum, in setting free potash and magnesia, absorbing and fixing ammonia, is useful in enabling the roots to find a better supply of food.

*Thinning the Flower Buds.*—Bush, pyramid, cordon, espalier, and wall trees are often crowded with blossom, much dropping without setting, and of the fruit apparently set most, often all, is cast in stoning. Severely thinning the blossom buds when unfolding favours a good set, prevents the fruit dropping, and enhances its size and quality. Half or more of the blossom buds may often be removed with advantage, especially in the case of trees that are “pictures of beauty” in spring, but usually cherryless in summer.

*Protecting Blossom.*—Trees on south or east walls, espalier, cordon, bush and pyramid trees in early seasons and warm sites, are liable to have the blossom and young fruit injured by spring frosts. Slight protection is all that is necessary. Wall trees are easily protected as well as other forms described in the article “Protecting Blossom,” Vol. I., page 193. Coddling, however, must be avoided, for the cherry detests confined moist air, and no more shelter should be used than is absolutely essential to the safety of the blossom and embryo fruit.

*Fruit Dropping.*—Frost is often attributed as the cause of this. Frost-bitten blossoms do not set; young cherries injured by inclement weather rarely reach the stoning stage. Trees against buildings are more frequently fruitless than those in the open. Want of proper supplies of nourishment is a prevalent cause of cherries which blossom freely being fruitless year after year. Trees in dry situations, in hot seasons, should have water and liquid manure abundantly. Those which rarely set a crop of fruit may have a good supply of the latter before the blossom buds unfold, and the soil must not be allowed to become very dry in summer. Cherry trees cannot be expected to do other than cast their fruit when languishing in dry situations.

*Thinning the Fruit.*—Where fine fruit is desired the cherries should be thinned where too thickly set, operating as soon as the fruits are safely swelling. Take out the small and ill-shapen first with scissiors, reducing the number gradually till one-half or one-third only of the cherries commonly allowed to remain for the crop are left, and those the best placed. This secures finer specimens and often prevents a loss of crop another year through the trees being over-burdened with small cherries and therefore exhausted.

*Watering.*—Cherry trees in dry sites and hot soils need, as stated above, copious supplies of water in dry weather, from the time the fruit is set till the crop is gathered, and the buds for next year's bearing are duly formed. Water, of course, must only be given when necessary; then supply it in quantities to thoroughly moisten the soil to a depth of 2 feet. Mere wetting of the surface benefits but little. Copious waterings at weekly intervals may be necessary in porous soils; those of a holding nature will only need supplies at fortnightly or three weeks' intervals. The correct thing is to examine the soil and when it is getting dry afford a thorough soaking so as to moisten it evenly throughout the area occupied by the roots.

*Feeding.*—Liquid manure may be supplied to weakly trees and those carrying heavy crops, instead of water, say when the fruit is set, again in three weeks, and a third time when the fruit has stoned; but needless applications of liquid manure are prejudicial. If the weather prove dry, and the trees have produced heavily and are weakly, afford a generous supply of liquid manure in August or early September. This will assist the trees to recuperate. For forms of liquid manure, see Vol. I., page 56

*Top-dressing and Mulching.*—To accelerate the growth of the current crop, superphosphate of lime, two parts, and muriate of potash, one part, mixed, and sprinkled on the surface at the rate of  $1\frac{1}{2}$  ounce per square yard, as far outwards from the stem of the



trees as the roots extend, when the flowers fade, will do good, repeating as soon as the cherries have stoned, washing it lightly in. Heavily laden trees may be given a dressing of the mixture oftener—say, when the fruit is set, the size of large peas, stationary in stoning and showing ripening colour. The quantity named should not be exceeded, and the mixture must be kept off the foliage.

Mulching should be spread on the soil, about an inch thick, by the middle of May, never later than early in June. The soil has then become warmed and moistened by the early summer sun and rains, and the surface has not become sun-dried and cracked. Add to the mulching as necessary, but a 1-inch mulch of partially decayed material answers every useful purpose. Waiting until the trees are seen to be overburdened with fruit before applying top-dressings or mulchings is a too common mistake.

*Washing the Foliage.*—To free the growth of dust and insects it is a good plan to syringe the trees well with the garden engine late in the afternoon or evening of fine days. If given prior to watering, it to some extent renders the watering more efficient, especially at the foot of walls. Clear water only need be used, and the syringing must cease directly the fruit begins to ripen. All other aids in cultivation must more or less fail if the trees are not kept free from insects.

*Protecting the Fruit.*—In large cultures it is necessary to employ a man with a gun, then many acres can be kept from jackdaws and starlings. Nets are absolutely essential to preserve cherries on garden trees. Herring nets exclude blackbirds and thrushes, but pilchard netting is required against the smaller birds. The netting should be stretched tight and a foot off the cherries. The protection must not be delayed beyond the change of colour for ripening. Hexagon netting or coarse muslin excludes bluebottle flies and wasps, at the same time admitting air and screening from the sun. This protection is necessary in open situations. In exceptionally frostless and rainless autumns, Morello cherries hang in good condition till Christmas against north walls with ordinary netting protection. Other varieties hang a considerable time, provided the fruit is shielded from powerful sun and rain, whilst accorded a free circulation of air.

*Gathering.*—All palates are well catered for in cherries. Choice fruit for home dessert should always be gathered with a portion of stalk, detaching them with scissors. Those for packing should be gathered with the stalks intact, separating them carefully from the spur or branch, as they keep much better with their full stalks. If gathered in that way when thoroughly ripe and suspended in small bunches in a cool fruit room,

they remain fresh several days, even weeks, and if the stalks are inserted in water in bottles, similar to grapes, cherries will keep months in a cool place. Some cherries have a perceptible bloom; this must be preserved, for rubbed fruit is greatly impaired in appearance. The fruit should always be gathered dry, and dished with its own leaves.

#### CULTURE UNDER GLASS.

Growing trees under glass is the best way to obtain the finest fruit early and late. A cheap unheated house is all that is necessary to produce cherries from June to October inclusive. It must be rain and bird proof, thoroughly ventilated, and light. Lean-to structures are suitable. The aspect may be south for early, east for second-early, west for mid-season, and north for late crops; but the fruit produced in the shade never has the quality of that produced in full sunshine. A wall case, 6 feet wide, may have trees planted against the back wall, and low trees in front, say single upright cordons, trained 1 foot from the glass. Wider houses can have bushes in front, but the wall trees in no case must be shaded.

Span-roofed houses may be any width from 6 feet, that height at the sides, and 9 feet in the centre, with vertical cordon trees on both sides, trained 1 foot from the glass so as to cover the whole of the roof. These corridor-like houses afford an agreeable promenade—interesting and profitable. Structures 18 feet wide accommodate trees on both sides trained to a trellis 1 foot from the glass in fan-fashion, which suits the Bigarreau and large black cherries. The trees may be in bush, pyramid, or standard forms, planted out, or in pots or tubs. If planted out, the roof-lights should be movable, for exposure after the crops are gathered invigorates the trees, prevents premature development in the blossom-buds, and arrests growth in early spring. Trees in pots or tubs can be withdrawn and stood outdoors after they are cleared of their fruit, protecting the roots from frost, returning them to the house before the blossom-buds unfold. Respecting the merits of the two systems a word or two may be acceptable. Planted-out trees, trained to trellises, or as standards, with the heads near the glass, produce the finest cherries. Trees in pots entail more labour in watering, yet are more under control, and more easily managed.

*Potted Trees.*—Select young trees just coming into bearing, preferably established in 10 or 11-inch pots one or two years. Those of that age may be potted from outside. Larger and older trees are sometimes chosen for potting or tubbing. They answer very well when prepared for removal by carefully lifting them and shortening the roots every



autumn. Pot firmly, using good fibrous loam, water at once, and plunge the pots in ashes in an open situation. Trees potted in autumn or early spring will be established by the following autumn, furnished with blossom-buds, and fit for placing under glass, provided they have had proper attention in watering, pinching, and keeping clean during the summer. The trees should be kept outdoors until the buds begin swelling, then placed under glass.

Trees in pots must never lack water at the roots, and after the fruit is set it is well to give liquid manure at every alternate watering. Surface dressings of rich compost, such as sweet, lumpy manure and fresh loam, the size of an egg, encourage surface roots, especially if sprinkled with superphosphate, soot, or other fertilisers. When the crops are gathered, place the trees outdoors, attending to them in watering, and keeping them clean. If it is desired to increase the size of the trees, shift those which most need it into larger pots, and top-dress the rest with fresh soil, before the leaves fall.

*Planted-out Trees.*—Replace the roof-lights when the buds commence swelling, and treat the trees similarly to those outdoors as regards training, pinching, and pruning. They require due supplies of water and nutriment. In the early stages of growth little will be needed, and when in free growth once a week will be often enough to supply water, affording it, whenever required, thoroughly, yet not excessively. Light mulchings encourage surface roots, and save watering.

Syringing must be practised over the trees in the morning and early afternoon on fine days, from the fruit setting till it commences to colour for ripening, when water must be withheld from the cherries. Avoid syringing on dull days, damping the house instead, and sprinkle the floors occasionally on bright days, whilst the fruit is ripening, ripe, and hanging, to insure the health of the foliage. After the fruit is gathered, again have recourse to syringing in the morning and afternoon.

A little ventilation is essential in the early stages of growth whenever the temperature exceeds 40°, to insure a circulation of air. This is imperative in structures that are so closely made as to be almost air-proof. Some houses, however, receive air through the laps of the glass, badly-fitting ventilators, and spaces between the boards, and do not require more when the temperature is low. In the former case, cherry trees often cast their blossoms without setting, whilst in the other they are loaded with fruit; therefore the ventilation must be ample, especially during flowering, opening the ventilators fully during mild weather. When the fruit commences swelling, open the

house wide at  $50^{\circ}$  and close at  $55^{\circ}$ , if it is desired to accelerate the ripening, otherwise air can hardly be given too amply to cherries under glass. Later crops may have the house left open day and night during the finishing of the fruit, for the chief consideration as regards these is protection from rain and birds. Exclude the latter by covering the ventilation spaces with small-meshed netting.

When the fruit is gathered remove the roof-lights, and do not replace them until the buds are advanced in swelling the following spring. Top-dress the borders with fresh loam, cleanse the house, dress the trees, and keep an eye on birds, which some-

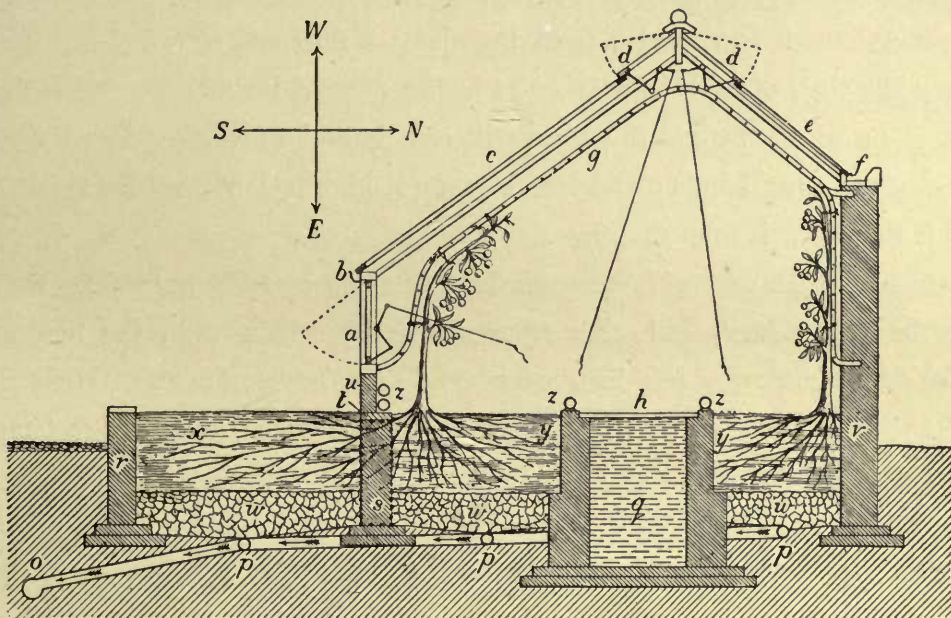


Fig. 47. THREE-QUARTER SPAN-ROOF CHERRY HOUSE. Section through I 2, ground plan, Vol. I., page 71.

(Scale:  $\frac{1}{8}$ th inch = 1 foot.)

*References* :—*o*, main drain ; *p*, border drains ; *q*, rain-water tank ; *r*, 9-inch retaining wall ; *s*, 9-inch pillars ; *t*, stone head, or  $4\frac{1}{2}$ -inch brick skew-back arches over openings ; *u*,  $4\frac{1}{2}$ -inch wall built in cement ; *v*, 14-inch back wall ; *w*, rubble drainage ; *x*, outside border ; *y*, inside border ; *z*, 4-inch hot-water pipes ; *a*, front lights ; *b*, spout ; *c*, movable front roof-lights ; *d*, top lights ; *e*, movable back lights ; *f*, gutter ; *g*, trellis ; *h*, pathway.

times prey on the buds. Where the roof-lights are not movable, open all doors and ventilators ; also attend to the watering and syringing of the trees, so as to keep the foliage healthy till it falls.

*Forcing*.—The chief point to be attended to in forcing cherries is the ventilation. This needs to be free at the time the trees are swelling their buds and developing the flowers, as well as during the blossoming, setting, and stoning of the fruit. Cherries are debilitated by a close atmosphere, the trees shedding their blossoms without setting



their fruit. Imperfection in the fructifying organs, however, may be due to other causes, such as overcropping, drought, or injury to the foliage by insects, and other hindrances to perfect bud formation in the preceding year.

*House.*—For early forcing, lean-to structures facing south-east, south, or south-west are best. An unpretentious wall case, 6 to 7 feet 6 inches wide, erected against a 10 or 12 feet wall, with 3 feet upright front lights, top lights 3 feet deep, set at an angle of  $45^{\circ}$ , these and the front lights being made to open outwards half their depth throughout their length, and the other part of the roof formed of 2-inch lights, secured to the rafters with screws for portability, answers admirably for early forcing. A trellis must be fixed 9 to 12 inches from the glass: a flow and return 4-inch hot-water pipe placed just clear of the border 18 to 24 inches from and along the whole length of the front, and a batten path at the back, will complete the fittings. Fan-trained trees with 3 feet stems must be planted in the structure described at the distance from the front lights the trellis is from the glass.

Lean-to houses 12 feet wide accommodate trees on a trellis extending about two-thirds up the roof in front, and other trees against the back wall, the borders being wholly inside. Four rows of 4-inch pipes, two near the front and two along the front side of the path, are necessary to afford warmth, for heat radiated at a high temperature is inimical to the cherry.

Span-roof structures answer for forcing. Those 15 to 18 feet wide, so as to accommodate trees on both sides in a 6-feet wide border, and a 3-feet wide pathway up the centre, are excellent, either for fan-trained trees on a trellis, standards planted out, or trees in pots. Two rows of 4-inch pipes on each side are necessary.

A three-quarter span, the long side of the roof facing south, is good for cherries, for a large amount of light enters by the northern slope, and the vigour, usually very decided at the extremities of the upper branches of the trees, is restrained by the downward training on the north slope of the roof. It also gives the cultivator an opportunity of laying-in young wood there, and thus obtaining finer fruit than is practicable on branches closely spurred. The illustration (Fig. 47) on page 143 will elucidate many essential points relating to forcing cherries.

*Border.*—This must be properly drained, the base of the border inclining to the drains. These should be 6 feet apart, 3-inch pipes sufficing, truly laid, having a proper fall, and connected with a main drain to convey the superfluous water away. Place broken bricks or stone rubble 1 foot thick over the drains, rough at the bottom and

about the size of road metal at the top, all clean, and over that spread a 2 to 3-inch layer of old mortar rubbish or weathered chalk, the finer particles sifted out with a  $\frac{1}{2}$ -inch sieve, reserving the fine for mixing with the compost. If the old mortar rubbish or chalk is not obtainable, cover the drainage with a layer of fresh-cut turves, laid the grass side downwards, and on that the compost 27 to 30 inches deep, allowing about 6 inches more for settling down, which it ought to do somewhat before the trees are planted.

*Compost.*—Virgin loam, cut 3 to 4 inches thick with its turf where the soil is friable yet not light, substantial but not heavy, and preferably on calcareous formations, suits the cherry. If, as occurs in some localities, the loam is interspersed with calcareo-silicious rocky fragments, or chalk with flints, nothing further is required. Light loam may have a fourth of clay marl, dried and pounded, or heavy loam, incorporated through it to render it more sustaining; heavy loam should have a fourth of sharp road scrapings added to it, and intermixed. Good loam need only have one-sixth of road scrapings added. Soil deficient in calcareous matter may have a fourth to a sixth of old mortar rubbish added, when heavy; light soil may have a similar proportion of chalk mixed with it. Manure should only be used where the soil is poor, or deficient in humus, and then in moderate quantity. The turf should be chopped up, all the ingredients thoroughly incorporated, and formed into the border when moderately dry.

*Trees and Planting.*—Fan-shaped trees are the best where there is a good surface of trellis or wall to cover. Those two or three years trained to walls and lifted in the previous autumn are the most suitable. Similar remarks apply to cordon and standard trees. They should be planted as soon as the leaves commence falling, and have the roots laid in the top 9 to 12 inches of soil, firming it well, and giving a good watering. The house must be kept open until the time arrives for starting the trees. It is preferable, however, where practicable, to remove the roof-lights, and let them remain off till the trees are started.

*Starting.*—Trees forced regularly start promptly, and ripen their crops at a given time with remarkable precision. Those forced for the first time are later in starting and perfecting their fruit. This must be taken into consideration, for, though ripe cherries may be had by the middle of April from trees started at the new year, it is necessary that the trees be afforded ample time to grow and perfect their fruit, also to form the next year's crop in embryo in the buds. Trees brought forward rapidly often resent the treatment by casting the flowers without setting, or shed the fruit in stoning. Regard must also be had to the varieties, for in a house containing early and midseason



varieties, such as Belle d'Orleans and Early Rivers, Black Tartarian and Governor Wood, the former will ripen a fortnight to three weeks in advance of the latter. Assuming those varieties to be forced for the first time and started about the middle of December, the early sorts ripen their fruit towards the close of April and the midseason varieties about the middle of May. The following year the trees will ripen their fruit earlier by a fortnight, starting at the time appointed with little artificial excitement. Seasons also influence the ripening of the fruit, making a difference of several days, and it is always good practice to proceed cautiously in forcing when external conditions are unfavourable.

To have cherries ripe in April, forcing must commence about the middle of December. Trees started at the New Year ripen their crops early in May. Houses started early in February afford ripe cherries later in May. Cool house trees ripen their fruit early in June. Cherries, however, hang a considerable time; therefore, one forced house of cherries affords a supply of fruit from April to June inclusive.

*Forcing to Time.*—Close the house the first week in December. Maintain a night temperature of  $40^{\circ}$ ,  $40^{\circ}$  to  $45^{\circ}$  by day artificially,  $50^{\circ}$  in mild weather, ventilating at  $50^{\circ}$ , and closing at that figure. In a fortnight maintain  $50^{\circ}$  by day, admit a little air, more at  $55^{\circ}$ , closing at the same,  $40^{\circ}$  at night by artificial means. Continue this treatment, bringing the trees into flower gradually with a night temperature of  $40^{\circ}$  to  $45^{\circ}$ ,  $50^{\circ}$  by day, admitting air at  $50^{\circ}$ , more at  $55^{\circ}$ , not allowing  $65^{\circ}$  to be reached without full ventilation, closing at  $55^{\circ}$ . Under these conditions the flowers will be fully expanded at the close of January or early in February, when  $5^{\circ}$  more all round may be allowed in mild weather; otherwise adhere to the temperatures named. A comparatively high temperature from sun heat accompanied with free ventilation enhances the growth of the foliage and fruit without prejudice to the crop. When the cherries have stoned, the temperature may be gradually raised to  $60^{\circ}$  at night,  $65^{\circ}$  on dull days, and  $70^{\circ}$  to  $75^{\circ}$  from sun heat with a free circulation of air from  $65^{\circ}$ . Under those circumstances the fruit of midseason varieties will be ripe enough for first dishes about the third week in April, early varieties at the close of March or early in April. All will not be ready, but enough for first dishes, which please the eye more than the palate, for cherries require a little time to mature after they become sufficiently coloured for gathering. Gradually lower the temperature, admit air freely, yet maintain a minimum of  $50^{\circ}$ . Remove the roof-lights at the end of June. Trees in pots are best for very early forcing, but the same trees should not be forced year after year, for very early forced trees are liable to blossom prematurely, and it is not desirable to subject planted-out

trees to hard forcing. Trees against back walls, as shown in the section, Fig. 47, must only be considered temporarily useful whilst the trees on the front trellis are low. They are also serviceable when it becomes necessary to introduce new trees.

*Pruning.*—Prune the trees directly the leaves have fallen, by cutting out dead and useless spurs, thinning crowded, shortening elongated, and cutting back pinched shoots to an inch of their base. These remarks apply equally to potted and to planted-out trees. Extensions must not be shortened except for originating more growths; the central shoot or shoots of young trees need this for filling the space with regularity. Cleanse the house and trees. Limewash the walls, train the trees to the trellis, remove the loose material on the border, supply fresh loam, mulch with an inch of short manure, and let the lights remain off till the time of starting the following season.

#### DISEASES.

The cherry is not so liable to disease as some fruit trees. Gum is the most disastrous, and is fully treated in Vol. I., page 234. Mildew sometimes attacks the blossoms and young fruit and growths; see Vol. I., page 245.

*Leaf-spot* (*Septoria cerasina*).—This minute fungus produces dark masses on the leaves, preceded by yellow spots, disorganising their tissues, absorbing their fluids, and causing their discoloration and premature fall. The *Septoria* is increased by minute long, slender, thread-like sporidia, and when they fall on a fresh leaf surface, where there is a little moisture, they soon germinate, bore through the epidermis, and give rise to fresh spots. Spraying the trees with a simple solution of sulphate of copper, 1 pound to 25 gallons of water, before the buds unfold, and with a solution of ammoniacal carbonate of copper diluted with twice the quantity of water just named, when the leaves are about one-third grown, and two other sprayings at fortnightly intervals, is recommended.

The cherry also is sometimes infested in its fruit by *Oïdium fructigenum*, already alluded to under "Apple Diseases," page 36, and which will receive further attention under "Peach Diseases." Yet another fungus destructive to ripe cherries is that called *Glæosporium læticolor*, referred to under "Apricot Diseases," page 87, and which will be figured under "Peach Diseases."

#### ENEMIES.

Cherries do not suffer so much from insect pests as the apple, pear, and plum, yet they are subject to attacks by some of the most pertinacious and repulsive.



*Aphides*.—More than one species of aphides infests the cherry. Green fly is most abundant on trees grown in the open, but the black fly, *Aphis cerasi*, Vol. I., page 258, is the most hurtful. It is conspicuous by its black hue and filthy secretions, which clog the leaves and spoil the fruit. Measures to be taken for the prevention and destruction of aphides are given in Vol. I., page 259. It is very important that the trees should not be neglected. Diligent attention before the flowers expand so as to have the trees perfectly free of aphides is paramount in securing a good set and fine cherries.

*Caterpillars*.—The larvæ of some moths infest the cherry, devouring the leaves and young fruit. One of the most troublesome on trees against walls and under glass, is the apricot moth, *Tortrix angustionora*, often eating the cherries. See page 90 for treatment. The caterpillars of the winter moth, *Cheimatobia brumata*, and those of the mottled umber moth, *Hybernia defoliaria*, devour the leaves and young fruit voraciously, and must be destroyed by Paris-green sprayings, as described in Vol. I., page 293. The larvæ of the small ermine moth, *Hyponomeuta padella*, occasionally attack cherry trees, burrowing in the leaves during the early spring, but in May they show themselves on the web which they spin in company, and soon defoliate a large tree. For means of destruction see Vol. I., page 286.

*Red Spider*.—Except in dry seasons, soils, and situations, the cherry is little infested by red spider outdoors, but under glass there is always danger of attack by the diminutive pests. Trees outdoors that are subject to the attacks of red spider should be well supplied with water and liquid manure in dry weather, mulching over the roots so as to conserve the moisture. The foliage also should be well washed, using soapy water in the early stages, following with clear water, but soapy solutions must not be used after the fruit commences to ripen, or it will leave a deposit on the cherries, greatly detracting from their appearance, and clear water used too long will cause them to crack. Remedies in other respects may be the same as those devised for "Red Spider," Vol. I., page 270.

*Scale*.—This seldom attacks trees outdoors; those, however, grown under glass are liable to be infested by brown scale, the same that attacks the peach, and is best destroyed by a winter wash of soft soap, 3 or 4 ounces to a gallon of water, using a brush discreetly. During the growth of the trees it is safest combated with petroleum emulsion, or resin compound. See "Scale," Vol. I., page 273; also "Peach Diseases."

*Slug-worm* (*Selandria atra*, Stephen and Westwood) (*Tenthredo cerasi*, Linn and

Curtis).—The damage done by the larva of this sawfly to the leaves of the cherry and other fruit trees is sometimes considerable, the larva being repulsive in appearance. The slug-worms (larvæ) are sluggish in their habits, but very voracious, feeding on the upper surface of the leaves, consuming the soft parts, leaving only the lower skin of the leaf, veins, and midrib, the whole leaf turning brown and ultimately falling. The devastating nature of slug-worms is shown in the engraving.

The sawfly is one-fifth of an inch long, black, shining, and hairy, wings transparent, with a smoky band across the middle. The insects appear in July, and sham death when alarmed. The female deposits eggs on the upper surface of the leaves in a slit made by her ovipositor, each separately; these are oval, and hatch in a few days, the egg having an elastic shell, increasing in size before hatching. The larvæ are at first very small, and soon become coated with a thick slime of blackish brown, which emits an unpleasant smell. In a month or five weeks the larva attains full size, about half an inch long, up to which it is greenish yellow with a black head; behind that is a sort of hump, and from the head, where it is largest, tapers sharply to the tail. The slug-worm has ten pairs of feet, and glides slowly over the leaves feeding with the tail a little elevated. At the last moult the larvæ become yellow, caterpillar like, and shortly afterwards quit the leaves, having preyed on them from the middle of August until October, descend to and enter the ground, where they spin an oval cocoon, coated on the outside with earth, from which the sawfly emerges in the July following.

The attacks of slug-worms may be lessened by shaking the trees on which the sawflies are found in the morning and evening during July over a sheet placed on the ground, the insects dropping when disturbed; they should be promptly destroyed.



Fig. 48. SLUG-WORM OF CHERRY AND PEAR SAWFLY (*SELANDRIA ATRA*) INFESTING CHERRY SHOOT.

References :—1, Sawfly magnified; natural length and expanse of wings, lines on left. 2, Larva (slug-worm) slightly enlarged. 3, Cocoon. Upper part of cherry shoot shows slug-worms destroying the leaves, so weakening them that they form wood-buds only in their axils; unaffected leaves at the lower part of the shoot, with fruit buds.



Spraying trees liable to the attacks of slug-worms with petroleum emulsion renders the foliage obnoxious to the sawflies, but it can only be practised over trees cleared of their fruit. Syringing with soapsuds from the first to the third week in August, once or twice a week, destroys the young caterpillars; and a solution of soft soap, 2 ounces to a gallon of water, with a pint of tobacco juice added, sprayed on the upper surface of the leaves, kills the pests. These applications, however, spoil any ripe or ripening fruit upon the trees, unless well washed off with clear water. Dusting the upper side of the leaves with freshly-burned newly-slaked quicklime, repeated once or twice at short intervals, say of half an hour, completely kills the slug-worms, and is the least objectionable as regards the fruit. When the trees are clear of their crops, the following mixture may be used as a spray over the trees. 1. White hellebore powder, quite fresh, 1 ounce to a gallon of water, in which 1 ounce of size has been dissolved while the water was hot, adding the hellebore while hot, mixing, and using when cool. 2. Paris green, 1 ounce to 10 gallons of water. 3. Freshly-burned lime,  $\frac{1}{2}$  peck, water 12 gallons; place the lime in a tub, slake, add the water, stirring well, allow it to stand twenty-four hours, then pour off the clear water. Dissolve 1 pound of soft soap in 2 gallons of boiling water, adding to the lime water; and also add 1 gallon of tobacco water—made by steeping 4 ounces of the strongest tobacco in a gallon of boiling water, letting stand until cool, then straining. Mix all together and apply with a syringe or garden engine. This may be used against all the insects to which the cherry is subject, yet such applications must be carefully employed where the fruit is advanced in ripening or hanging. Similar caution is necessary in applying all insecticides to cherries, as they are eaten with the skins, and cleansing with water is more or less imperfect.

Once trees are infested with slug-worms the attacks are recurrent and local; therefore prompt steps must be taken against the invaders. The pupæ may be destroyed in winter by removing the top 3 or 4 inches of soil from below the trees infested and burning it. This is very effectual. Supply fresh soil in place of that removed.

## CURRANTS.

**C**URRANTS are the fruit of well-known shrubs, near allies of the gooseberry. They are found wild in woods and thickets in various parts of Asia, Europe (Britain), and America. There are three distinct types:—1, the Black Currant, Quinsy Berry (*Ribes nigrum*); 2, the Red Currant, Wild Currant, Garnet Berry (*R. rubrum*); and 3, the White Currant, a variety of the last species (*R. r. album*). The cultivated varieties are not very numerous, but considerable confusion exists in their nomenclature; this is in some measure due to variation through the effects of soil, locality, and cultivation, and advantage has been taken of it to give new names to old varieties, while in some cases local names are given because the proper ones have been lost.

For cultural purposes, as well as distinct uses, currants are divided into two sections:—I. Black; II. Red and White.

### I.—BLACK CURRANTS.

The fruit is largely used in tarts and puddings; it produces a fine jelly, much recommended in cases of sore throat; also makes excellent jam and wine. The Russians put the berries into brandy, and the Irish into whisky, in the same way as the English use cherries. The Russians also ferment the juice with honey, and so form a strong and palatable wine. Black currants are not greatly in request for dessert, the only variety suitable for the purpose being Lee's Prolific.

### VARIETIES OF BLACK CURRANTS.

**BALDWIN'S.**—Bunches medium; berries very large, sweet, and well flavoured; a robust grower, and very productive. One of the best for market.

**BLACK NAPLES** (Carter's Champion).—Bunches rather short; berries large, juicy, sweet, and rich; a sturdy grower, and very productive. The best for general work.

**LEE'S PROLIFIC.**—Bunches long, and freely produced; berries large, nearly uniform in size, sweet, and richly flavoured, hanging late; a free grower, not very hardy; productive.

**OGDEN'S BLACK.**—Bunches short; berries medium to large, juicy, and good; a sturdy grower and free bearer, hardier than most varieties.



SELECTION OF BLACK CURRANTS.—Three varieties for general cultivation :—Black Naples, Lee's Prolific, and Baldwin's. Two profitable varieties :—Black Naples and Baldwin's. One variety for general purposes :—Black Naples. One variety for quality :—Lee's Prolific. For training to walls for hanging late :—Lee's Prolific. For cold localities :—Ogden's Black.

*Propagation.*—The black currant is readily grown from cuttings. These may be 12 to 15 inches in length, of straight, firm, young wood. All the buds should be cut out, except those intended to form branches, if the bushes are to be grown with short, clean stems. If they are to grow in the natural manner, set the cuttings as they are taken from the parent bush, merely cutting each transversely below a joint at the lower end, and removing the top. The cuttings should be inserted firmly 6 inches deep, and 6 inches apart, in rows 1 foot asunder, as soon as the leaves can be shaken off in the autumn.

When the shoots push in the spring, three should be encouraged on plants to be grown with a clean stem, rubbing off the others. Cuttings that produce three strong shoots the first year will be ready for transplanting the autumn following their insertion, but if the shoots are not strong, cut them back to a bud or two, and let the plants remain another year. Cuttings inserted with all their buds, two or three only being left above ground, may push three or more good shoots, and all may be left; but if, through weakness, one only starts freely, let it grow, and cut it off about 4 inches from the ground in the autumn. Strong growths will follow in summer, and the plant will be suitable for removal in the autumn.

By the methods described two essentially different plants are produced. One has a clean stem of 4 inches—a little more or less, and no suckers. This answers well when no mishap occurs to disturb the equilibrium of the branches; but in the case of borers, or accident causing the collapse of one side of the bush, the defect is not easily remedied. The other kind of bush does not invite borers, because its stem is not dried by exposure; and in case of a branch failing, it is easily made good by a sucker springing from the base. Gardeners, as a rule, prefer clean-stemmed bushes, and these often give full satisfaction; yet fine fruit and heavy crops are borne on young healthy growths, and a succession of these is maintained by suckers taking the place of worn-out branches.

*Situation.*—The finest fruit is produced on bushes in open, yet sheltered, situations. Bleak, high and dry sites will not grow black currants profitably. They succeed fairly in moderate shade, as between rows of standard fruit trees, but if much shaded there will be little fruit in consequence of soil exhaustion. Shelter from strong winds is absolutely necessary, for if a gale occur when the fruit is advanced in growth it is seriously battered,

or, if ripe, it is scattered on the ground. Exposed sites may be protected by a hedge. Naturally sheltered situations are best, such as hollows, or flat sites, where the violence of the wind is broken by higher ground or distant trees. In such places, and in good soil, the black currant luxuriates and produces abundant crops. It requires moisture, and thrives in ground by the side of ditches, brooks, ponds, and other damp places where no other fruit can be grown satisfactorily. It also succeeds at high elevations, giving bountiful crops in sheltered positions upwards of 500 feet above the level of the sea.

*Soil.*—The black currant delights in a deep rich mellow loam, preferring alluvial soils on a cool base. It utterly fails in dry, sandy, or gravelly soils, moisture being indispensable for its well-being. Clay soil mollified with sand, rendering it permeable by the small feeding roots, is suitable for black currants; and the rather strong loam intermingled with flints, such as obtains in some parts of Hertfordshire and in East Kent, produces the fullest crops of the finest fruit. Though wet land grows black currants, it must not be flooded, as where water lodges and the soil is saturated, they will not flourish. Under such conditions drains must be provided—open where convenient—to prevent the water standing within 18 inches of the surface. The ground should be stirred as deeply as the good soil allows, breaking up the bottom, and if poor, and especially if light, a liberal amount of partially decayed manure should be mixed with the top spit. Ground in good heart will grow black currants well for years without manure, if they are not roughly dug amongst with spades so as to destroy the surface roots.

*Arrangement.*—Black currant bushes are frequently planted in a single row in borders along the sides of paths, or next the boundaries of gardens, where they spread more and produce greater crops of finer fruit than do bushes grown close together in quarters. This suggests that they are seldom given room enough. A space of 5 feet must be allowed between them, and in rich soil 6 feet is not too much. A foot greater distance between the rows than the bushes are in them is distinctly advantageous, both as regards cropping and facilitating cultural operations. Nothing is gained by unduly crowding black currants but a thicket of fruitless growths.

*Planting.*—The best time to move black currants is directly the leaves have fallen, as the earlier they are planted the sooner they become established, and the better they will bear. They may, however, be safely transplanted during mild weather from November to February inclusive. A multitudinous number of fibrelets form under favouring conditions in advance of top growth. Early planting insures free rooting and good



growth ; late planted bushes seldom push strongly and are noted for producing indifferent fruit. A little rich compost mixed with the soil used in covering the roots in planting contributes to a good start, and free growth can afterwards be maintained by mulching over the roots with manure.

*Training.*—Two methods are followed in training, as in raising, black currants:—1, clean stemmed trees ; 2, natural bushes. These forms are represented in the accompanying illustrations. Cutting the branches of the young tree (*T*) back to inside buds about 4 inches from their base, when transplanted, causes two or more shoots

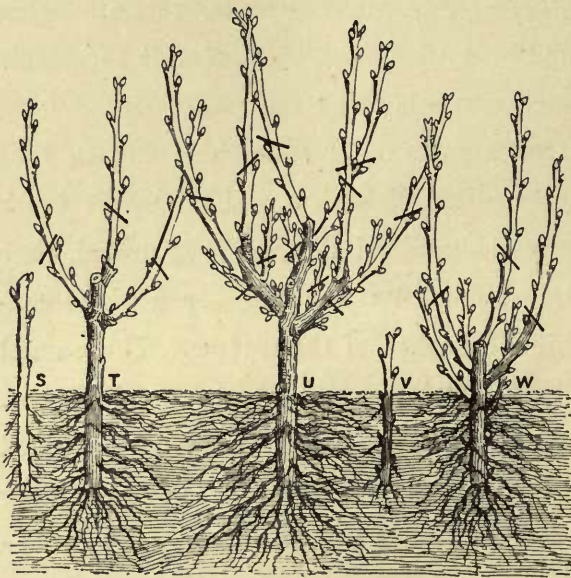


Fig. 49. MODES OF TRAINING BLACK CURRANTS. CLEAN STEM TREE. NATURAL BUSH.

*References :*—The three figures on the left show the formation of a clean stemmed tree : *S*, a cutting with buds removed, except the three uppermost ; *T*, a one-year-old tree marked for pruning to inside buds ; *U*, a two-year-old tree marked for shortening. The two figures on the right show in *V* a cutting inserted with all its buds ; *W*, one-year-old bush marked for pruning.

to push from each branch the following spring. In the autumn of the second year the tree will consist of six shoots. These should be cut back to outside buds about 6 inches from the previous year's wood, and the smaller shoots closely shortened. The two-years tree (*U*) and its pruning are shown in the figure.

The following spring two shoots will start strongly from each of the six branches, the tree then having twelve main growths, and it will produce fine fruit freely in the fourth year from the cutting, some having been borne previously. In the third autumn the leading shoots will not require shortening unless a few are much longer than the rest, and these may be cut back to

preserve the symmetry of the bush ; otherwise pruning must be confined to cutting out elongated and enfeebled branches with the object of encouraging the production of sturdy young growths for bearing. This will be made plain presently.

*Natural Bushes.*—The cutting inserted with all its buds, as shown in the above illustration, will push shoots strongly from its upper buds the following spring, and others of less vigour as represented in *W*. The stronger need only be shortened to about 6 inches from their base, the smaller shoots being left intact. This will give ample

growths the following season, and fruit will be borne freely in the third year from the cutting. The bush is the most durable form generally in which to grow the black currant, and with due care in thinning the suckers, as may be needed, abundant crops of fruit may be had for many years.

*Pruning.*—The black currant bears the finest fruit on the wood of the previous year, but it also produces freely on the stubby shoots and spurs along the branches provided they are sufficiently far apart to admit light and air. Pruning must be confined to cutting out superfluous and ill-placed growths, also shortening those that are irregular, whilst the bush is extending. A succession of bearing wood will then be main-

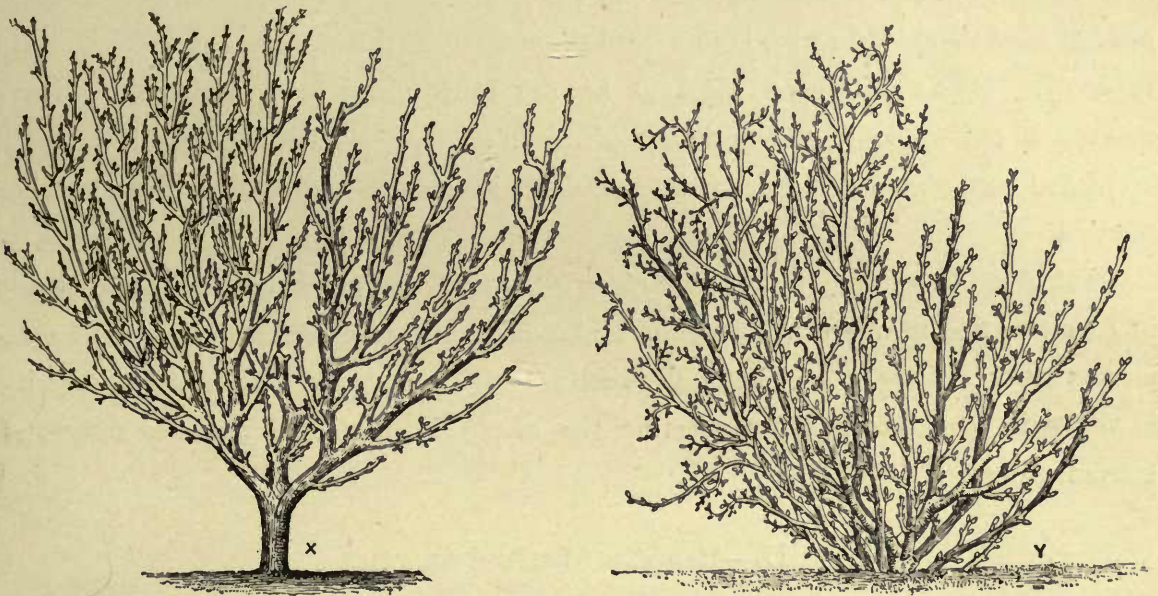


Fig. 50. BLACK CURRANT BUSHES BEFORE AND AFTER PRUNING.

*References:*—X, clean stemmed tree: left side unpruned but marked for pruning; right side pruned. Y, natural bush, left side unpruned and crowded with suckers; right side thinned and shortened for bearing.

tained, capable of producing the best of fruit. The accompanying illustration will be helpful to the inexperienced.

It will be seen that the bushes are not spurred, the pruning being confined to thinning out the old wood to give room for the development of young, and whilst no suckers are allowed on the clean stemmed bush, those on the natural bush are thinned to prevent overcrowding, removing them at their origin with the root stem.

*Training to Walls and Fences.*—The black currant does well secured to a wall or fence, either trained close to the surface or allowed to grow out as a half bush. In



either case the pruning should be the same as advised for bushes. When trained to a north wall or fence, the fruit ripens later and hangs much longer than on other aspects. The trees produce excellent fruit when they are managed on the same principles as the Morello cherry (page 133), extra-fine fruit being had for exhibition by thinning it early, and supporting the crop with liquid manure.

*Feeding.*—Manure from cow stables is especially serviceable in the production of black currants. It should be applied in the autumn after pruning, pointing it in lightly with a fork. A space all round each bush as far as the roots are matted at the surface, say 1 to 2 feet from the stem, may, however, be covered with manure, and this in turn covered with a thin layer of soil taken from the spaces between the bushes. When these are full sized the simplest plan is to spread the manure on the surface, and leave it there to decay. Root mutilation is fatal to healthy growth and productiveness. Where manure is not available, the drainings of manure heaps, stables, and cow-byres may be poured on the ground about the bushes, both in summer and winter, for enriching the soil.

Mulching the ground over the roots with littery manure before dry weather sets in conserves the moisture in the soil, and liquid manure given when the fruit commences swelling improves it materially both in size and quality. Water is a necessity in dry soils and seasons for perfecting the crop. For artificial manures see "Red Currants."

## II.—RED AND WHITE CURRANTS.

Red currants are in great demand for tarts, pies, and puddings, with a few raspberries for flavouring; they are used alone for making jellies and wine, but raspberries are mixed with them for making jam. Fine, clean, ripe fruit is esteemed at dessert, especially that which is kept sound to a late period, on account of its refreshing sub-acid flavour and attractive appearance.

White currants are sometimes used with red currants to make a bright red jelly, as the latter used alone produce dark jelly. The fruit, however, is chiefly in request for dessert, particularly when fully ripe, and late in the season. With a few red ones an attractive dish is made for table. One white currant bush to about twelve of the red kind suffices to meet the requirements of most establishments for a supply of fruit, but individual preference and requirements will naturally determine the proportions of the two kinds to plant. The red currant is essentially a culinary fruit.

## VARIETIES OF RED AND WHITE CURRANTS.

CHAMPAGNE (Cerise, Couleur de Chair, Ombrée, Pheasant's Eye, Red Champagne).—Bunches medium ; berries of good size, pink or flesh coloured, with red veins ; pleasantly flavoured ; useful for dessert ; a compact grower, and profuse cropper.

CHERRY (Chénonceaux, De Caucase, Defiance, Fay's Prolific, Fertile d'Angers, Fertile de Palluau, Hâtive de Bertin, La Hâtive, Rouge de Boulogne, Scotch Red).—Bunches short ; berries very large—the largest of red currants ; deep red, handsome ; growth upright ; dwarf and compact ; very free bearer.

CHISWICK RED (à Feuilles bordées, Large Sweet Red).—Bunches short ; berries small, pale red ; bush of dwarf growth ; profuse cropper.

CUT-LEAVED (à Feuilles laciniées).—Bunches and berries medium size, bright red, brisk acid : growth slender, spreading, free cropping ; distinct in appearance, the leaves being much cut and lobed ; more curious than useful.

HOUGHTON CASTLE (Houghton's Seedling).—Bunches medium sized, produced in dense clusters ; berries medium, dark red, briskly acid ; growth vigorous, yet sturdy, and very prolific.

LA VERSAILLAISE (Belle de Fontenay, Frauendorf).—Bunches medium, irregular ; berries very large, deep red, fine acid flavour, handsome ; growth strong, shoots gross, easily broken off at the base, and the buds break irregularly, causing an uncertain crop.

RABY CASTLE (Goliath, Houghton Castle of some, Late Dutch, Mallow-leaved, May's Victoria).—Bunches medium to very long ; berries medium to large,

pale red, acid ; strong grower, making a large bush ; moderate to good cropper.

RED DUTCH (Knight's Large Red, Large Red Dutch, New Red Dutch, Pitmaston Red, Red Foxley, Rouge de Hollande, Wilmot's Large Red).—Bunches medium, 2 or 3 inches long ; berries large, bright red, brisk acid ; bush vigorous, erect, yet compact ; free and abundant bearer.

REINE VICTORIA (Red Grape, Warner's Red Grape).—Bunches very long and loose ; berries medium size, pale red, brisk acid ; late ; growth spreading ; productive.

COMMON WHITE (Blanche Commune, Blanche Transparent).—Bunches short ; berries medium, bright-skinned, sweet ; growth spreading, but slender ; good cropper.

CUT-LEAVED WHITE (à Feuilles laciniées, Shilling's Queen, Wilmot's Large White).—Bunches medium ; berries medium, clear-skinned, sweet ; free slender growth ; profuse bearer.

GROSSE BLANCHE (Knight's Large White).—Bunches medium ; berries large, clear and sweet ; growth moderate, rather spreading ; free bearing.

MACROCARPA (à Feuilles bordées).—Bunches medium ; berries large, cloudy-white, rather acid ; growth strong and erect ; profuse cropper.

WHITE DUTCH (Blanche d'Angleterre, Blanche d'Hollande, Jeeves' White, Morgan's White, New White Dutch, White Crystal, White Grape, White Leghorn).—Bunches medium ; berries large, yellowish white, somewhat transparent ; moderate compact grower, and free bearer.

SELECTIONS OF CURRANTS.—Three *red* varieties in order of succession :—Cherry, Red Dutch, and Reine Victoria ; most serviceable, Red Dutch ; compact growers, Chiswick Red and Houghton Castle ; for walls, Raby Castle ; for dessert, Cherry and La Versailles. Three *white* varieties :—Cut-leaved, White Dutch, and Macrocarpa ; best general, variety for walls and bushes, White Dutch.

*Site*.—Red currants are very hardy, thriving in bleaker positions than the black kind. They afford useful late crops against walls or fences with north aspects, the fruit there keeping well. Bushes give the best results in open situations, with shelter from cutting winds ; they prefer high to low sites, yet succeed in the latter when the land is properly drained.

*Soil*.—Red and white currants succeed in any good soil, 18 inches deep, but prefer rather strong loam if well drained. Lighter land will grow good fruit if properly



manured; indeed, with mulching, red currants can be grown on sandy soils where black currants would not thrive well.

*Arrangement.*—Both red and white currants are sometimes arranged as single lines to form boundaries or screens to vegetable quarters, where they bear abundantly, provided the bushes have ample space for development. Pyramids may be planted 6 feet apart in borders by the sides of walks. Standard currants can be grown 6 to 9 feet apart along the margins of paths, where they are both ornamental and useful, the ground between them being available for low-growing crops, such as strawberries or salads. Against walls or fences, trees may be planted at various distances, 9 inches to 1 foot for single cordons; 3 feet for upright trained trees with four branches. Bushes of free-growing varieties in the open should be placed 6 feet asunder in rich soil. Due regard must, however, be had to the habits of the varieties, affording the compact-growers the least, and the vigorous kinds the most, space. All, as a rule, are planted much too close for the production of heavy crops of fine fruit. Planting red and white currants is the same in time and manner as described for black.

*Training.*—The bush form is that usually adopted with the red and white currants, their propagation and early training being the same as that advised for the black currant with a clean stem of 4 to 6 inches (Fig. 49, *S*, *T*, *U*, p. 154). The six-branched bush, there marked for the second pruning, will in the third year push two shoots from each branch, twelve in all. At the autumn pruning it must be decided whether the bush is to be grown with six or more branches. In poor soil and where close planting is practised, six branches will be sufficient, whilst in good soil and at a greater distance apart, nine to twelve branches may be left as leaders, equally placed around the stem. The centre of each bush should be kept open. Any shoots that tend inwards or to cross others should be cut out. The main branches ought not to be nearer each other than about 9 inches; they open out when producing fruit. The ends of the branches should be shortened to between 6 and 9 inches at every winter pruning, until the bushes have attained a height of 3 to 4 feet; then shorten them more closely, eventually leaving two or three buds only for extension. A number of side shoots push each year from the main branches. These lateral growths may be topped in June to five or six leaves, and if other growths issue, stop them at one leaf. At the winter pruning every shoot not required for extension must be cut back to  $\frac{1}{2}$  inch of its base, close to a bud, for when a snag is left beyond the bud, water enters the pith and frost rends the shoot, causing it to die back.

*Pyramids.*—In forming these, which are very handsome, the central branch of the young tree, Fig. 49, *T* (page 154), should be cut back to 9 inches in the autumn, and the other two shortened 3 inches more to outside buds. Three growths must be encouraged from the leading branch the following year, and two from each of the side branches, all others to be pinched at the third leaf. In the autumn the leading shoot is shortened to 9 inches, the other main branches to 6 inches, and the remainder of the shoots cut back to  $\frac{1}{2}$  inch of their base. The pyramid will now be 2 feet 3 inches to 2 feet 6 inches high, and  $1\frac{1}{2}$  feet through at the lower tier of branches. These last should be again forked, also the next tier and the leader, as in the preceding year. The lower tier of branches must be shortened in the autumn to 4 inches, and the others as before advised, continuing this year by year until the pyramid is as high and wide as desired, when it should be closely spurred in.

*Standards.*—If a cutting be taken 18 inches in length and not topped, all the buds removed from the lower 6 inches, and this part inserted in the soil, the leading shoot secured to a stake, the side shoots pinched at two leaves, and to one afterwards, it will make rapid progress towards forming a stem the first year. By continuing the practice, the stem thickens evenly, the pinching of the side shoots pushing the leader ahead. After this has attained a height of 4 feet, it should be topped a few inches lower in the autumn, and in the spring following three to five shoots will push to form the head. Shortening these to 9 inches in the autumn will cause them to fork, and the following year a selection can be made of the requisite number to form a symmetrical tree. All the others should be pinched in the summer, and cut close back in the autumn to form spurs for bearing in due course. The pinched-back growths on the main stem may be removed at the end of the third year, but it is best to reduce them gradually. Standard currants must be securely staked. They are both interesting and useful, bear profusely, and might be grown with advantage in many gardens; the fruit is easily protected from birds with netting.

*Upright-trained Trees.*—Encourage one upright shoot from a cutting. If it grow strongly, cut it down to 6 inches; if weakly, cut it back to 3 inches of the ground in the autumn. The object is to secure two strong branches for training horizontally to the left and right in the summer, shortening them to about 14 inches in the autumn. From these horizontals train four upright shoots, one at each extremity, with others at  $4\frac{1}{2}$  inches on each side of the stem, thus having them 9 inches apart; allow these to grow full length, and shorten them in the autumn to 8 or 9 inches. Train a leader from each



every summer, and shorten them to the height named every autumn. The laterals will need stopping and spurring in. (See "Pruning.")

*Cordon Trees.*—Single or double cordons for walls or fences are easily formed by cutting back a young plant with a strong shoot to 12 inches from the ground; train one shoot from it upright the following year, pinch the side growths, shorten the upright shoot to 9 inches in the autumn, and the laterals to  $\frac{1}{2}$  inch of their base. Repeat in the following season, and so on till the cordon attains the height required; then keep the growths closely spurred. A double cordon has two main stems trained 9 inches apart, the leaders and side growths being treated as advised.

*Pruning.*—There are two kinds of pruning, summer and winter. Summer pruning is of essential value, as by shortening the growths their base buds are fed, and the fruit is improved in size and quality. Some growths, however, are necessary to maintain activity at the roots and elaborate the sap, yet crowding causes poor foliage, weak wood, and light crops of fruit; moreover, the growing shoots of currants are often infested with aphides, which spoil the fruit by their secreting so-called "honeydew." These pests are to a great extent got rid of by summer pruning, if the prunings are promptly burned. The process consists in stopping the branch extension growths to 9 or 12 inches, according to their vigour, and the side growths to five or six joints, operating about midsummer—a few days sooner or later, as the season is early or late. Full-grown bushes need the extremity shoots pinched the same as the side growths. Other growths may follow the pinching; it is not necessary to restrict them, unless they produce more than two or three leaves and are infested with aphides; then pinch off their ends at one or two joints. Avoid crowding any shoots that may be intended to replace worn-out branches. Summer pruning admits light and air to the interior of the bushes, and, if rightly practised, undoubtedly promotes fruitfulness. This, with the methods adopted, are shown in the illustration.

Winter pruning consists in cutting back all side and spur shoots to within  $\frac{1}{2}$  inch of their base. Some persons cut to a single bud, less than  $\frac{1}{2}$  inch; others leave three buds, an inch. Red and white currants, however, submit to close pruning to basal buds (not below them) without prejudice to fruit or shoots, and keeping the spurs close to the branches prevents overcrowding. The shoots at the extremities of the branches require shortening to 6 inches if weakly, or to 8 or 9 inches when strong. More than 6 to 9 inches of growth is apt to cause the branches to be too sparsely furnished with spurs for bearing, and too weak to support the weight of fruit. Bushes in full bearing

make little more wood than is necessary for their continued fruitfulness, and only need the extremity and side shoots spurring closely in at the winter pruning. When the branches become too long they may be shortened to convenient growths lower down, or cut clean out in favour of promising growths springing from the base. This is very desirable when the branches are aged, and the spurs thick and long, for the fruit is then



Fig. 51. CHARACTERISTIC GROWTHS AND FORMS OF RED CURRANT BUSHES. SUMMER AND WINTER PRUNING.

References:—*Z*, unpruned side branch; *1*, pruning mark too low—no basal buds. *A*, pruned side branch: *i*, summer growth pinched at the bar; *j*, second growth; *k*, point of winter pruning. *B*, bush in summer: *l*, three branches with side growths unpinched; *m*, two branches with summer shoots pinched. *C*, standard. *D*, bush in winter: *n*, three unpinched branches marked for pruning; *o*, branch with detached shoots, indicating winter pruning; *p*, pruned branch. N.B.—The bush has nine branches, four at the back not shown.

produced in "heaps," and decays rapidly in wet weather, often before it is ripe. Thinning the spurs moderately obviates that defect, and the fruit is larger and keeps longer; but cutting out old branches and supplanting them with young secures the finest and heaviest crops over the greatest number of years. Cutting off the heads of old bushes, and commencing with new growths from the base of the branches, affords



good results in a couple of years, provided the stems are sound, and the roots well attended to in manuring. When the stems are defective, and strong growths do not follow after cutting back, it is better to uproot the trees, having others planted in fresh ground two or three years before, so as to afford the necessary supply of fruit. Pruning is best performed in the autumn, directly the leaves have fallen, but currants are so hardy that the work may be done at any convenient time up to the time the buds commence swelling.

*Winter Culture.*—After pruning, clear away the rubbish. If there are any suckers, remove them close to the root stem, not leaving any buds. Should the bushes be infested with moss or lichen, dust them well with quicklime after rain or whilst damp, that falling on the ground will act as a fertilizer, and sweeten the soil. This repeated every second or third year keeps the bushes clean. Draw the earth from around them, supply manure in its place, and cover this over lightly with soil taken from the open spaces. Spread the removed soil over the undisturbed space, apply a dressing of manure, about three barrow-loads per rod, or thirty-two one-horse cart-loads per acre, dig it in with a fork, and bury the annual weeds, which, with care, can be done without injury to the roots. The manuring between the bushes may be omitted when they bear satisfactorily without such dressing. While the bushes are small the top-dressing around them suffices, and, where manure or rich compost is not available, 2 or 3 gallons of cesspool or manure-tank contents poured round them in winter, as far outwards from the stem as the bush is high, will improve the growth and crop the following summer. Full-sized bushes may be given two or three times the quantity named.

In the absence of stable manure “artificials” may be employed. 1. Bone meal,  $3\frac{1}{2}$  cwt.; kainit,  $1\frac{1}{2}$  cwt., mixed, per acre,  $3\frac{1}{2}$  pounds per rod, 2 ounces per square yard. Apply in autumn or February. Double the quantity may be applied to poor soil, sprinkling it on the surface as far as the roots extend. This mixture is substantial, often showing good results until the third year. 2. Superphosphate of lime, 2 cwt.; nitrate of potash, 1 cwt.; sulphate of lime, 1 cwt., mixed, per acre, 3 pounds per rod,  $1\frac{1}{2}$  ounce per square yard. Supply in March or early April. Where the soil is poor and the growths weak, double the quantities, and to secure fine berries apply  $\frac{1}{4}$  pound per square yard. This mixture only “lasts” one year. 3. Nitrate of soda,  $2\frac{1}{2}$  cwt. per acre,  $1\frac{3}{4}$  pound per rod, 1 ounce per square yard. Use from the buds swelling to the fruit setting. It is best for light soils. Supply double the quantity when more growth is wanted, applying half when the buds swell, the other half when the fruit is set.

4. Common salt, 5 cwt. per acre,  $3\frac{1}{2}$  pounds per rod, 2 ounces per square yard in light soils; in medium-textured soils 2 to 3 cwt. is a sufficient dressing per acre. Apply in March.

*Mulching.*—Because currants are easily grown, they are apt to be neglected in poor soils. This is a great mistake. Liberal treatment pays at least 50 per cent. A light mulch of any coarse manure, lawn mowings, or rough vegetable matter, applied after the fruit is set, greatly aids the crop, and if supplemented by two or three generous applications of liquid manure, the berries will be doubled in size in dry sites and seasons.

*Thinning the Fruit.*—This is seldom practised, but to secure extra-fine produce, a selection should be made of the largest and most evenly set bunches directly the flowering is over, cutting away the rest with scissors, and leaving each bunch clear of its neighbour. This secures, with high culture, clusters of fruit far beyond the normal size, evenly coloured and possessed of the most juice and the highest finish and flavour. The practice is commended to those desiring high-class fruit for dessert and exhibition, but liquid manure must not be applied after the fruit commences colouring.

*Protecting the Crop.*—Blackbirds and thrushes must be kept at bay by placing netting over the bushes; herring nets suffice for these birds, but pilchard nets are necessary to exclude the smaller birds, one of the greatest pilferers being the redbreast; the protection must be applied to bushes before the fruit changes colour for ripening.

*Gathering the Fruit.*—Though inadvisable to gather fruit before it is ripe, it is necessary in wet seasons to secure currants at every favourable opportunity, for a few days' continued wet may spoil a whole crop by the earliest ripe berries decaying and spoiling the rest of the fruit on the spur. Gathering, however, ought not to be done when the fruit is wet. Dessert fruit must of necessity sometimes be gathered wet, but it ought to be spread in a room to dry before sending it to table.

*Keeping the Fruit.*—This is practised largely in private gardens with red and white currants. The fruit keeps the longest on north walls, but is there ill-flavoured. It hangs well on low walls with east aspects when protected. Where wasps and blue-bottle flies abound hexagon netting must be used. This, kept at a distance from the currants, throws off the rain at the side, and a coping-board to a wall or oiled calico over cordon trees shields them from wet from above, this dryness and the free access of air insuring a supply of fruit to a late period. Covering bushes with clean Archangel mats is a very old and very bad practice as regards the bushes, but excellent in respect



to the fruit, which in all but very wet seasons keeps remarkably well. The mats should be used when the fruit is evenly ripe, and if supported in the form of a cone, instead of being flat at the top, heavy rains are thrown off, but the mats should be loosened at the bottom on a fine day so that the air may dry the fruit as well as the covering. Thus dried, the fruit will keep as late as desired. Different bushes should be selected each year for matting, as they are more or less weakened by the process.

*Forcing.*—Currants are had early by planting against south walls, and they may be forced. Bushes on short stems or standards are suitable, and if placed in a light orchard house in spring, afford richer fruit than that grown outside. Small bushes laden with fruit are charming for table decoration, especially garden parties and tea parties of juveniles. In forcing they succeed under the same temperatures and conditions as advised for cherries.

*DISEASES.*—Currants are not subject to many diseases, and those seldom inflict much injury. The gooseberry fungus (*Æcidium grossulariæ*) rarely attacks currants, except when adjacent to gooseberries or in bad years. The *Æcidium* causes discoloured spots on the leaves, and renders the fruits useless. See "Gooseberry Fungus."

*ENEMIES.*—Aphides, caterpillars, gall mites, shoot grubs, and woolly scale are the chief pests infesting currant bushes. The Black Currant Louse (*Aphis ribis-nigri*) attacks the young shoots and becomes firmly seated on the under side of the leaves, abstracting their juices, stunting the growths, and spoiling the fruit. In its young state the aphid is whitish, and much sought after and devoured by the common sparrow (*Passer domesticus*). The Red Currant Louse (*Aphis ribis*) fastens on the points of the shoots, clusters on the under sides of the young leaves, and renders the fruit loathsome. About the end of March or early in April, the viviparous females may be found at the base of the buds; that is the time to attack them, for by killing the first generation they are prevented multiplying. Bushes dusted with quicklime, or smeared with Taylor's mixture (page 191, Vol. I.) for the preservation of the buds from birds, are seldom infested with aphides, as the eggs are destroyed, but when that has not been done, care should be taken to exterminate the spring brood. This may be effected by washing the bushes when the buds are unfolding or shortly afterwards with the following mixture:—quassia chips, 3 pounds; soft soap, 3 pounds; rainwater, 48 gallons. Steep the chips in cold water twelve hours, then boil for two hours, strain and add to the soft soap, dissolved in the remainder of the water, mix, and apply at 90° to 100°, syringing from below as well as over the bushes so as to wet every part. Repeat if necessary,

but after the fruit is one-third grown use the quassia decoction only (1 ounce to a gallon—3 pounds to 48 gallons of water), syringing so as to reach the under side of the leaves. In bad attacks pursue the treatment advised for Aphides (page 258, Vol. I.), cutting off all infested shoots that can be spared, and destroy them at once. Remember that the fruit must be clean; therefore, wash it thoroughly with clear water after annihilating the insects.

*Caterpillars.*—The larvæ of the Magpie Moth and Gooseberry Sawfly sometimes do a great deal of injury by stripping the bushes of foliage. See “Gooseberry Enemies.” The caterpillars of the Winter Moth often feed on currant bushes under standard fruit trees, and may be destroyed by spraying with Paris green. See “Winter Moth,” page 289, Vol. I.

*Gall Mites.*—Though so small as to render a microscope indispensable in examining them, the Gall Mites are highly destructive. They infest many wild and cultivated trees or plants, and cause the buds of currants to swell greatly, remain unopened, or form sickly growth. Of late years the Black Currant Mite has done serious injury, and appears by some writers to be regarded as a somewhat new enemy, but we have known it for a quarter of a century.

The Rev. M. J. Berkeley had specimens submitted to him in 1869, and in the same year Professor Westwood described the insect in the *Gardeners' Chronicle*, from which the accompanying figures are taken.

The Currant Gall Mite is  $\frac{1}{200}$ th inch in length, and  $\frac{1}{800}$ th inch in greatest width. It is reproduced by eggs in February and August. The mites may be found active amongst the inner scales of the buds in mild autumns and generally early in spring. The injury they inflict on the Black Currant consists in feeding on the embryonic leaves and flowers, causing the buds to become swollen and abortive.

Attacked shoots should be sought for every spring, and when found, at once cut off and burned. This prevents general infestations, because mites must have time to



Fig. 52. CURRANT GALL MITE (*PHYTYPHUS RIBIS*) AND INFESTATION.

*E*, infested growth; *F*, clean growth; *G*, attacked buds showing mites—small dots in scales; *H*, young mite greatly enlarged; *I*, perfect mite, highly magnified.



multiply and spread. It should also be widely known that no mite can withstand sulphur, particularly bisulphide of calcium (see "Mildew"), or soft soap, sulphur, and soda wash (page 270, Vol. I.). Syringe the bushes thoroughly directly the fruit is gathered with bisulphide of calcium, at the strength advised for mildew, clear away the leaves as soon as fallen, and in dry weather syringe the bushes thoroughly with the mixture, repeating in February. The soft soap, sulphur, and soda wash (Vol. I, page 270) may be used as a spray in November and February, wetting every part of each bush. These measures and the removal of infested parts subdue the mites. Infested bushes should never be propagated from.

*Currant-shoot Grub.*—Currant trees sometimes lose branches suddenly, which wither

and die without apparent cause. This is occasioned by the grubs or caterpillars of a moth, shown in the illustration, clearing out the pith of the stems.

The moth is about  $\frac{3}{4}$  inch in expanse of wings, barred and veined with black, otherwise clear. It appears in June or July, flies only during hot sunshine, and lays its eggs in openings of the bark. The caterpillar eats its way to the pith directly it is hatched, the attack generally beginning where the stem was pruned the former year, and it follows the pith downwards, eating until full-fed; then, after gnawing an exit hole to the



Fig. 53. CURRANT CLEAR-WING MOTHS; *SESIA* (SPHINX, *ÆGERIA*, *BOMBECIA*) *TUPLIFORMIS*.

*J*, attacked branch, and withered shoot, *q*; un-attacked branch and healthy growth, *r*; *K*, larva, in shoot; *L*, grub, enlarged; *M*, pupa, enlarged; *N*, moth, enlarged: lines on the left, natural expanse and length.

outside of the branch, it turns into pupa in the stem. The caterpillar is fleshy, whitish, with a brown head. Its attacks are most prevalent in black, red, and white currant bushes, but it also infests gooseberry bushes.

Preventives consist in catching the moths, either when settled on currant leaves, or flying around the flowers of lilac and other shrubs. Spraying the bushes early in June with the petroleum emulsion or resin compound (page 261, Vol. I.) renders them obnoxious to the moths, which consequently deposit their eggs elsewhere. Shoots or branches becoming sickly should be cut off just above a joint with healthy growths, and burned. If the wood is split the grub will be found in the pith. Sickly branches must not remain longer than pruning time, nor suffered to lie about in gardens and orchards.

*Woolly Currant Scale* (*Pulvinaria ribesiæ*, Signoret).—This pest occurs on black, red, and white currant bushes, also on some species of *Ribes* and *Pyrus*. It has infested currant bushes for many years, but has not spread to any great extent; yet it recurs at intervals, and appears to have been acclimatized since 1880. It was introduced from the Continent, and has increased more of late years than formerly through increased commercial intercourse. The scale resembles that of the vine, but is smaller, thicker, and more heart-shaped, longer in the embryo state, and with more cottony matter, which is drawn out by the young scales in all directions, extending from branch to branch in web-like order. They appear about midsummer, and are then readily destroyed by spraying with Coates' wash (page 260, Vol. I.), or resin compound. In winter spray the bushes with the above-mentioned caustic solution, or dress them thoroughly with Taylor's composition (page 191, Vol. I.).—Trees against walls and in warm situations are the most liable to infestation.

Red spider and thrips occasionally infest currant bushes, and should be destroyed by the remedies prescribed for each in Vol. I., pages 269 and 274 respectively. Lichen and moss weaken the growths and harbour insect pests. We have only to repeat that a dusting with quicklime in winter whilst the bushes are damp with mist or fog destroys the incrustations, and is a good preventive of birds taking the buds.



## EUGENIA.

**E**UGENIA (Myrtus) Ugni has not proved equal to the high commendations lavished upon it when first introduced as a fruit-bearing shrub said to be adapted to the milder situations of this country. It is not sufficiently hardy to succeed against south walls, except in the south of England. It is a native of Chili (Valdivia), where the fruit is much esteemed; it is the size of a large black currant or small cherry, somewhat flattened, globular, and crowned with persistent calyx teeth, brownish-red or glossy

black, with an agreeable aroma. The pulp is light-coloured, soft, and juicy, with a sweet and spicy flavour, which is very pleasant to the palate. The juice expressed from the fruit, and mixed with water, furnishes a refreshing drink, with an aromatic odour.



Fig. 54. EUGENIA UGNI.

Eugenia Ugni is an evergreen greenhouse shrub of myrtle-like appearance, and bears white flowers on axillary pedicels, from the well-ripened wood. It is raised from cuttings of half-ripe shoots, or those becoming firm at the base, inserted in sandy soil, under a bell glass, or in a close frame. The young plants should be placed in 3-inch pots and grown with a single stem, in a light airy position in the greenhouse, pinching off the point of the shoot when 6 inches high, and the resulting growths

at 3 or 4 inches; they will then form thrifty bushes if transferred to larger pots. They grow well in a mixture of three parts fibrous loam, one part each of fibrous sandy peat and leaf soil, with one part of crystal sand and charcoal in equal proportions, to maintain sweetness and porosity. The soil must be pressed down firmly whether the plants are grown in pots or planted in borders.









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